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ERRATA

Vol 40 No 10 p 881 line 11	For To 5 c c of urine in a test tube
5 c c of reagent are added	read To 5 c c of urine in a test tube
5 drops of the reagent are added	
Vol 40 No 12 p 1017 line 19	For mice read lice

TROPICAL DISEASES BULLETIN

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[No 1

SUMMARY OF RECENT ABSTRACTS *

I CHOLERA

Bacteriology

VENKATARAMAN (p 139) confirms previous work by showing the existence of vibrios of the El Tor type in natural waters in the Madras area. The eight strains now reported were recovered from water tanks in a district in which earlier attempts had failed. [It will be remembered that in India the El Tor vibrio has repeatedly been found in water in areas entirely free from cholera and that there is no evidence that in India this vibrio is aetiologicaly related to any cholera like disease though such a connexion has been reported in Celebes.]

PANJA (p 241) has found that vibrios in the stools of cholera patients will grow through an L3 filter candle into surrounding peptone water much more quickly than organisms such as *Bact. allahigenes* motile coliforms and late lactose fermenters. He has put this finding to use in the isolation of cholera vibrios by mixing a small amount of stool with peptone water and partly aspirating it by vacuum action through the candle into the surrounding peptone water. He has also found that boric acid to a strength of 0.08 per cent in the peptone water (subsequently adjusted to pH 9) inhibits coliforms but not the vibrios. This method gave 87 per cent of successful isolations against 44 per cent by direct bile salt agar plating.

In a study of the pathogenic effects of vibrios injected subcutaneously into guineapigs PANJA & PAUL (p 909) has shown that *V. cholerae* and non agglutinable vibrios (from a case of cholera) invade the general circulation within about two hours but that vibrios from the water of the Hooghly river do not invade so early. Nevertheless all these vibrios are capable of killing the animals. No distinction between these vibrios can be made by feeding in guineapigs or by intravenous injection in rabbits. [It does not appear that these animal tests are likely to be satisfactory in the differentiation of vibrios.]

GALLUT (p 910) has obtained from cultures of *V. cholerae* a toxin which contains both glycolipidic and protein fractions. If it be accepted

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 v 40. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

that endotoxin is of glucolipidic and exotoxin of protein composition. The author claims that both are present in the toxin he has prepared.

Clinical Findings

PANJA *et al* (p 140) have isolated vibrios from a single specimen of vomit of cholera patients in 26 of 52 cases so examined. In some cases the pH of the vomit was below 5 and when this was so isolation failed. More commonly a pH of 6.0 to 7.5 was encountered and vibrios were frequently isolated at a pH of 7.0 to 8.4 isolation was successful in 12 of 14 examinations. Thus the more alkaline the vomit the better the chance of success. Direct plating on to bile salt agar and enrichment in peptone water were carried out both methods should be used since either may give a positive result when the other is negative but direct plating is the more commonly successful procedure. Of the 26 strains isolated 11 were agglutinable (Inaba or Oga) 5 were non agglutinable and 10 were lost before typing. Discrepancies were occasionally found between the vibrios from vomit and from the stool of the same patient more work is to be done on this subject.

It has been observed that in convalescents from cholera the gastric acidity is consistently low it has not been clear whether this is an effect of cholera or whether cholera attacks especially those with low acidity. NAPIER and GUPTA (p 539) have examined this question and in experiments with cultures of cholera vibrios exposed to the action of samples of gastric juice of different ranges of free and total acidity have found that the vibrios are killed very rapidly when the degree of acidity is such that 22 cc or more of N/10 NaOH are required to neutralize 100 cc of the gastric juice. In the absence of acid however the vibrios may survive up to 15 days. The authors conclude that the action of free hydrochloric acid is so fatal to the vibrio that a person with low acid gastric juice may be much more susceptible to cholera infection than one with a normal or high acid content.

Treatment

In an account of the outbreak of cholera which occurred in Hong Kong during the period 1937-1940 WILKINSON (p 843) raises important points in treatment. He states that hypertonic saline had not been proved to be demonstrably efficacious and claims that it might be the cause of acute toxæmia by causing fluid from the intestine to be drawn into the circulation. [This view may be compared with that of BANERJEE below who thinks that the effect of concentrated salt solution is to withdraw interstitial fluid from the tissues into the blood stream.] Wilkinson refers to the two great dangers to life in cholera hyperpyrexia during the stage of reaction and anuria. He gives instructions on the treatment of hyperpyrexia. [It will be remembered that PASRICHA *et al* (this Bulletin 1942 v 39 166) attribute much of the hyperpyrexia which follows intravenous infusion of saline to pyrogenic substances usually split proteins derived from bacteria present in the solution injected. PANJA *et al* (this Bulletin 194 v 39 839) claim that elimination of these pyrogens greatly reduces the incidence of febrile reactions. (See also CO TUI and WRIGHT below)] For anuria Wilkinson advocates intravenous bicarbonate saline hot rectal salines and cupping of the loins.

BANERJEE (p 454) contends that in cholera (as in burns pyloric obstruction and other conditions) hypochloræmia is a much more important factor than the loss of fluid. He reports that the intravenous injection of 50 cc of a 20 per cent salt solution rapidly lowered the specific gravity of the blood in five patients being equivalent in effect to 3 pints of ordinary hypertonic saline. This result appears to be due to the drawing of interstitial fluid into the circulation. Normally the proportion of interstitial fluid to blood fluid is 3 to 1.

It is known that patients receiving hypertonic salines are prone to rigors and pyrexia and that these effects are commonly due to bacterial proteins dissolved in the saline. Various methods of preparing solutions free from these pyrogens have been described and Co Tui and WRIGHT (p 140) advocate filtration through asbestos pads calibrated so that they hold back a standardized pyrogenic substance (prepared from a Berkefeld filtrate of a typhoid vaccine) to such a degree that a febrile reaction is not provoked when the filtrate is injected into experimental animals.

CHAI MAN (p 454) has observed that when rabbits are used for detecting the presence of pyrogenic substances in fluids for intravenous injection a rise in temperature is closely correlated with a reduction of 4 000 or more in the circulating leucocytes. The conclusion arrived at is that in the absence of this leucopenia after injection the solution tested may be regarded as free from pyrogens.

SADUSK and OSWALD (p 843) have investigated the bacteriostatic and bactericidal action of certain sulphonamides on *V. cholerae* in a synthetic medium which has no power of inhibiting the action of the drugs. Sulphathiazole is bacteriostatic in a concentration of 0.1 mgm in 100 cc and is much more active than sulphadiazine, sulphaguanidine and sulphanilamide. It may however be too readily absorbed from the intestine to be useful in the treatment of cholera and for this reason sulphaguanidine may be preferable since a concentration of 200 mgm per 100 cc may easily be attained in the stools.

Prevention

PANJA and GHOSH (p 910) have studied the action of potassium permanganate on *V. cholerae*, non agglutinating vibrios and other organisms in the presence of organic matter. In pyrogen free water it is lethal to *V. cholerae* at a dilution of 1 in 10^6 but in the presence of organic matter a concentration of 1 in 2 000 may be necessary. *Bact. typhosum* is not so easily killed nevertheless the authors state that fruits and vegetables artificially infected with cultures of *V. cholerae*, *Bact. typhosum* and *Bact. flexneri* can be effectively disinfected by soaking them in permanganate solutions of 1/5 000 to 1/10 000 dilutions for five minutes.

[These findings are surprising in view of previous reports of similar work. GOHAR (see *Bulletin of Hygiene* 1937 v 12 582) found that 1 in 1 000 permanganate was not enough to free artificially contaminated vegetables completely from *Bact. typhosum*. BERNARD (see *Bulletin of Hygiene* 1938 v 13 400) concludes that it is impossible to sterilize salad leaves with permanganate without spoiling their appearance. VAN DEN BRANDEN and GELIN (this *Bulletin* 1940 v 37 237) found that lettuce steeped in 5 per cent permanganate for one hour was not sterilized. In view of these conflicting reports and of the importance of the subject it would seem desirable that further tests should be made.]

RASTA and DOLMAN (p 540) note that cholera vaccine prepared from vibrios killed by phenol produced a better response in O and OH agglutinin titres in rabbits than vaccines killed by heat or formalin. Mice are susceptible to the cholera vibrio especially when its killing power is enhanced by suspension in mucin and a mouse protection test based upon the percentage survival of mice tested with mucinized suspensions has been suggested. [This would appear to offer a better estimate of the protective power of vaccines than the determination of agglutinin titres]

Charles Wilcocks

MALARIA

ZUMPT F MINNING W Malariabekämpfung in der Ukraine 1942
 I All eimeines ueber die Malariabekämpfung im Generalbezirk Nikolajew vor und nach der deutschen Besetzung [ZUMPT & MINNING] I. A General Account of the Malarial Campaign in the Province of Nikolayev before and after the German Occupation] *Deut Trop Ztschr* 1943 May 1 v 47 No 9 205-15 II Die Malarialage im Gebiet von Cherson [MINNING] [II The Malarious Places in the District of Kherson] *Ibid* May 15 No 10 237-41 III Erfahrungen und Beobachtungen während der *Anopheles* Bekämpfung im Generalbezirk Nikolajew [ZUMPT] III Experiences and Observations during the *Anopheles* Campaign in the Province of Nikolayev] *Ibid* June 1 No 11 265-83 17 figs [Numerous refs]

The authors were sent to the province of Nikolayev to take over the anti malarial work of the Russians they arrived at Kherson near the mouth of the River Dnieper on April 30th 1942 and remained in the district for 4½ months

They describe the Russian organization and methods which they say were well planned but badly carried out The Russians had established malaria stations and smaller posts Each station was directed by a qualified medical malariologist with an assistant and subordinate staff It was divided into clinical and entomological departments and had a laboratory and a propaganda museum The clinical department investigated and treated human malaria while the entomological department carried out the usual anti mosquito work In some stations aeroplanes were used for applying Paris green to large swamps and ricefields The stations and posts were closed in winter but the authors decided to keep them open and undertake anti typhus work during these months

II Minning reports on the results of blood-examinations of the population of Kherson and its neighbourhood. Malaria parasites chiefly *Plasmodium vivax* were found in 9-10 per cent of the population the incidence among adults over 30 years of age being nearly twice that in children under 10

III Zumpt describes the anti mosquito work. The predominant species of *Anopheles* was *A. maculipennis* *A. atroparvus* and *A. messeae* were identified from eggs deposited by female *A. maculipennis* A few specimens of *A. hyrcanus* were also obtained. Among Culicines were *Aedes caspius* *A. dorsalis* *A. flavescens* *A. leucomelas* and *Culex modestus*

A short account is given of trials with two aeroplanes received from Germany. Spraying of liquid larvicide was found to be useless and the aeroplane was returned but the other machine which was adapted for applying Paris green was found to be very suitable for the work.

J F Corson

- 1 KITCHEN S F & PUTNAM P Morphological Studies of *Plasmodium falciparum* Gametocytes of Different Strains in Naturally Induced Infections *Amer J Trop Med* 1943 Mar v 23 No 2 163-88 4 figs [11 refs]
- 11 ——— & ——— Comparative Morphological Studies of *Plasmodium falciparum* Gametocytes in Various Induced Infections *Ibid* 189-208 1 fig

1. From time to time observers have claimed that strains of *Plasmodium falciparum* from widely separated areas such as those of Europe and Africa differ from one another in certain characters particularly the shape of the gametocytes. These observers have in some cases considered the differences to be such that the creation of a new species of parasite was justified. In other cases the variations have been regarded as of sub specific value only. With a view to obtaining an accurate estimation of such variations and their possible use for distinguishing species the investigations described in these papers were undertaken.

Four strains of parasite from widely separated areas in the Western hemisphere were employed and these were studied in patients undergoing therapeutic malarial infections produced either naturally or artificially. The gametocytes were first studied and outline camera lucida drawings were made of the 16 types encountered. In addition fourteen different arrangements of chromatin and pigment were noted and each of these given a number. Similarly eight different types of pigment and twelve different types of chromatin were numbered according to individual characteristics. Thus by the careful study of any crescent it was possible to give it a formula embracing one or other of the features numbered in the four groups of characters. To carry out the study 10 or 15 male and female crescents were studied daily for a number of days in Giemsa stained thin films. The results of these studies and the various formulae obtained were subjected to detailed statistical analyses. The general results showed that the gametocytes of each strain displayed pronounced diversity as to shape and attributes of chromatin and pigment. This was particularly true of the female gametocytes. Daily mean lengths and widths varied considerably. Male gametocytes always showed a greater mean width while female gametocytes had a greater mean length. There was a tendency for the length of the gametocytes to vary inversely with the width. The wide intra strain diversity of attributes of the gametocytes in the four patients indicate the precariousness of any attempt to identify strains on the basis of morphological differences.

11 In the second paper the study was extended to gametocytes in patients naturally infected and in patients artificially infected in patients artificially infected with more than one strain and in one patient naturally inoculated in 1936 and another inoculated with the same strain in 1940. Though it was not possible to set up criteria for

identifying strains it was possible to define the outstanding characteristics of the gametocytes which are —

1 Male and female gametocytes are usually sausage shaped not as ordinarily described with the form of a crescent

2 In males the chromatin and pigment occupy both central and outlying zones. Among females they are more likely to occupy the central zone only

3 Individual pigment in males is diffuse and light either fine or coarse. In females it is compact and dark and may be annular but in the case of one of the strains it is likely to be diffuse coarse and dark

4 Individual chromatin in males is always diffuse and vesicular and partly enveloped by the pigment. Among females it is compact and vesicular but may be either wholly or partly enveloped

C M Wenyon

GLASGOW J P & MACINNES D G *Anopheles of British Somaliland East African Med J* 1943 June v 20 No 6 176-9 1 map

Anopheles gambiae appears to be the only malaria carrier of importance in British Somaliland. It maintains itself permanently in pools along the stream beds in some localities (e.g. Mandera and Lafer Ug) and in those places there is a low degree of endemic malaria with spleen rates somewhat greater than 50 per cent. At Buramo there is an annual epidemic of malaria when the breeding places are extended during the rains. In most parts of the country epidemics occur only in years of heavy rainfall when breeding extends everywhere into temporary rain water pools

I B Wilesworth

GENT J C *Three Cases of Malaria J Roy Nat Med Serv* 1943 July v 29 No 3 208-9

A paper by J V SMITH [this *Bulletin* 1943 v 40 215] on an outbreak of malaria in a cruiser prompted the author to record these three fatal cases of cerebral malaria occurring in sailors during August 1942

The first patient a stoker aged 42 had felt unwell for a few days but had not reported sick. On August 16th on getting out of bed in the morning he collapsed and was admitted to hospital at 6 a.m. unconscious and breathing stertorously. His rectal temperature was 110 F. A blood film showed subtertian malarial parasites. An intramuscular injection of quinine dihydrochloride 15 grains was given and he was sponged with iced water and fanned. His temperature fell within two hours to below 100 F but soon rose again reaching 104 F. At 10.30 a.m. he was given an injection of morphine and hyoscine as he had been very violent since admission. In the afternoon he was given a rectal drip of iced water 4 pints being retained. At 4 p.m. he became conscious and spoke rationally. At 9 p.m. he was becoming chesty and was given oxygen inhalation and sulphapyridine intramuscularly 1 gm every four hours. He became steadily worse and died next day at 10.50 p.m. [There is no mention of further doses of quinine.]

The other two cases had been treated for about three weeks for undiagnosed pyrexia during this time repeated examinations of the blood had failed to show malarial parasites. In each case the patient again reported sick a few days after the end of this treatment. One of

them Case 2 a man aged 26 was admitted on August 20th he complained of severe frontal headache since the previous day a rigor and a slightly sore throat His temperature was 104 F A blood film showed both benign tertian and subtertian parasites He was given quinine dihydrochloride first an intramuscular injection of 15 grains then 10 grains thrice daily by mouth His temperature varied from 99 F to 103 F until August 25th when at 2 10 p m it rose to 110 F Cold sponging was given but he collapsed and died at 4 25 p m [The quinine was apparently retained as there is no mention of vomiting]

The third patient admitted on August 21st was a man aged 31 He complained of severe pain in the head back and legs since the previous day His temperature was 103 F A blood film showed benign tertian parasites He was given quinine dihydrochloride 10 grains thrice daily by mouth Next day his temperature was normal and remained between 99 and 101 F until the morning of August 25th when it rose to 103 F At 4 25 p m he became much excited and his temperature was 106.8 F Cold sponging reduced it to 104 F but at 5 20 p m he collapsed and he died at 6 10 p m [In this case also there is no mention of vomiting having occurred]

The author thinks that though cerebral malaria was the primary cause of death in all three cases the element of heat stroke cannot be altogether ignored and the two diseases probably work together in the closest collaboration

J F Corson

BREWIS G S Pernicious Subtertian Malaria resembling Blackwater Fever / *Roy Nav Med Ser* 1943 July v 29 No 3 212

This is a description of a fatal case of subtertian malaria with symptoms of blackwater fever in a patient who had never had malaria before and who had taken no quinine He appears to have become infected on board ship (since he did not go ashore) during a stay of six days in Freetown harbour Sierra Leone on his way home from Alexandria His illness began at sea on about June 25th 1942 two to three weeks after leaving Freetown he felt ill and vomited after food but did not report sick He landed in this country on July 1st did not report sick and went home where he became very ill with high fever severe vomiting and delirium He was admitted to hospital on July 6th as a suspected case of Weil's disease and died on July 9th

Condition on admission—Dehydrated and jaundiced pulse 120 temperature 99 F liver enlarged and tender spleen not palpable blood pressure 120/80 blood—erythrocytes 4 000 000 haemoglobin 72 per cent leucocytes 16 600 (polymorphs 78 per cent lymphocytes 16 per cent monocytes 5 per cent) There was a very heavy infection of subtertian parasites which infected half or more of the red cells some of which showed three or four ring forms all forms from rings to mature schizonts but not gametocytes were seen Urine—acid deeply pigmented much albumen brown granular casts some leucocytes and erythrocytes Blood urea—360 mgm per 100 cc

Treatment—Quinacrine (atebrin) 0.1 gm six hourly with alkalis by mouth intravenous glucose saline drip infusion

Course—His temperature rose to 103 F vomiting subsided and he took 60 oz of fluid by mouth and 70 oz by intravenous drip infusion during the next 48 hours The blood picture remained as previously The excretion of urine gradually diminished only 32 oz being passed during his stay in hospital the last few ounces resembled curry soup

The blood urea rose to 672 mgm per cent. A blood count shortly before his death showed 1 600 000 erythrocytes and haemoglobin 36 per cent. He received altogether 0.8 gm of quinacrine.

Post mortem—The kidneys showed much degeneration of the epithelium of the convoluted and collecting tubules. The glomeruli were cellular but otherwise normal. Blood casts and pigment were present.

J. F. Corson

BARTOSHEVICH Y. N. [Cases of Infection with Malaria from Transfusion of Stored Blood.] *Sovetskaja Medicina* [=Soviet Medicine] 1941 No. 2: 32. [From a translation of the original Russian.]

The author records two cases of malaria in children, each due to transfusion of blood from the same donor. The donor had several times been examined for malaria with negative results and had moreover given blood on several occasions without untoward results. She was however a native of a malarial district and though there was no history suggestive of previous malaria, had probably harboured a latent infection. The view taken is that this was brought to activity by repeated venesection. After the last withdrawal of blood her spleen, hitherto not palpable, was found to be enlarged, but there were no parasites to be found in her blood. *Plasmodium vivax* was found in the blood of the children infected from this donor. The blood had in one case been preserved for three days.

Charles Wilcocks

BELTRÁN E. Estudio de cepas mexicanas de *Plasmodium vivax* en casos de paludismo inducido. [Study of Mexican Strains of *P. vivax* in Cases of Induced Malaria.] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico 1943 Mar. v. 4 No. 1: 31-48. 6 charts. [16 refs.] English summary.

Details are given regarding 30 patients suffering from neurosyphilis who were submitted to malaria therapy, four different Mexican strains of *P. vivax* being used for the purpose. Varying quantities of infected blood were injected subcutaneously immediately after withdrawal from the donor. In all of the patients parasites appeared in the peripheral blood. The average prepatent period was 9.6 days. Clinical symptoms of malaria developed in 27 of the 30 patients. In 2, the temperature rose above 40°C (104°F). The fever was quotidian in nine cases, tertian in eight and mixed in the remainder. The average incubation period was 9.6 days. The four strains differed somewhat in their behaviour but the number of observations was insufficient to warrant any general statements.

Norman White

HAUER A. Malariaerzidiy und Serumreaktion. [Serum Reaction in relation to Relapse in Malaria.] *Deut. Trop. Ztschr.* 1943 May 15 v. 47 No. 10: 241-7.

The author compared the serum reactions (Wassermann, Meinelcke and Kahn tests) in 866 cases of malaria, of which 517 were first attacks and 349 were relapses. The percentage of positive results among the patients with first attacks of malaria was more than ten times as high as in those with relapses. In both classes of patients a positive reaction was found more frequently in the earlier months of the year.

than in the later months. Positive reactions were on the average weaker in relapse attacks than in first attacks. In relapses a negative serum reaction may be found even after 20 or more attacks of fever; it is not connected with the species of malarial parasite nor with the country where infection occurred but is attributed to a special constitutional weakness (Anergie) of the individual who suffers relapses.

J. F. Corson

MUKERJI B. GHOSH B. K. & SIDONS L. B. The Search for an Anti Malarial Drug in the Indigenous Materia Medica. Part II—*Caesalpinia bonducella* Fleming. *Indian Med Gaz.* 1943 June v 78 No 6 285-8

An alcoholic extract of *C. bonducella* nuts (fat free powder prepared from the kernels) when fed in a dose up to 400 mg per gm body weight failed to arrest the normal multiplication of *P. gallinaceum* in domestic fowls; moreover the parasite showed no change in morphology. Mepacrine hydrochloride (atebrin) synthesized by local manufacturers in Calcutta produced both these effects. These results do not encourage tests with *nata* on other malarial infections—animal or human. It appears unlikely that *nata* has any specific action in malaria. [See this *Bulletin* 1943 v 40 670]

GORGAS MEMORIAL LABORATORY ANN. REP. 1942 [CLARK H. C. Director] 7-14 Experimental Work in Control of Malaria by the Use of Drugs

The 10 year programme of experimental study of malaria control by the use of either atebrin or quinine in villages in the mid basin of the Chagres River in Panama was concluded in 1940. [Summaries of the annual progress reports appeared in this *Bulletin*—that of the 10th and final report in 1941 v 38 511]. The work had shown that in places in which it is not feasible to apply satisfactory antimosquito measures the use of quinine or atebrin can secure good business control of malaria and improvement in general health. But though the transmission of malaria can be lowered to some extent it is not possible by these means to secure the eradication of the disease and the prevention of relapse.

Since the completion of the study programme surveys of the villages have been continued and the results of these surveys are summarized in this communication. In the treated villages blood film surveys were carried out every second month instead of monthly as in the experimental period. Persons harbouring parasites were given atebrin 0.1 gm thrice daily for five days or in the quinine group of villages 18 grains of quinine sulphate in tablet form each day for five days. The use of plasmoquine simplex was discontinued; it had not lowered the transmission rate to any appreciable extent. Control groups in the towns of Rio Pescado and Mendoza were surveyed once a month; the names of persons harbouring parasites were given to the school teachers who gave quinine to any who asked for it. Only a small amount of quinine was demanded.

The average monthly parasite rate for the atebrin treated population was 15.4 and for the quinine treated population 12.1. Both rates

were higher than for the previous year an increase probably due to the return of workers from rural labour camps. The average monthly parasite rate of Rio Pescado was 25.8 and of Mendoza the other control town only 7.4. Mendoza owes its relative protection to the facts that it is three miles from the lake and 300 feet above it and its farmhouses are dispersed in the hill. As in previous reports detailed information is given regarding the species of malaria parasites found, gametocyte carriers, the age incidence of infection and the intensity of infections. The year's work confirmed the conclusions drawn from the prolonged inquiry which have been mentioned above. *Norman White*

LEVENSON E. D. FASTORSKAYA E. I. KHOVANSKAYA A. I. & DUKHANTSA \ \ Experiences in the Control of a Malarial Focus in the North (Archangel Region) by Mass Chemoprophylaxis and Systematic Treatment of Malaria Patients (Russian). *Med. Parasit. & Parasitic Dis.* 1943 \ 12 Pt 1 23-38 [In Russian.]

In the Archangel region of Northern Russia the peaks of malarial incidence are at the end of May and in early autumn (end of July to September). In the period 1935-1938 considerable numbers of cases were observed e.g. in the Krasnoborsk sub-district alone 1 000 to 1 600 fresh infections in the peak month each year. Several thousand blood examinations were made, presumably on the sick; the tabulated results show that in some subdistricts infections with *P. vivax* were more numerous than those with *P. falciparum* but in others the reverse is recorded. The parasite index in (presumably healthy) children was about 10 per cent. before prophylaxis was instituted.

Mass prophylaxis by acrinin [mepacrine] was instituted in 1939 the details of dosage etc. being different in different sub-districts; the dose was generally 0.2 or 0.3 gm. daily for 2-5 days followed by an interval of 10-12 days when the course was repeated. This continued throughout the warmer part of the year generally starting in April. Those known to suffer from malaria were treated by acrinin and plasmoquine [plasmoquine] treatment starting early in the year before the disease became epidemic.

The result of the mass prophylaxis was seen in a rapid fall of the parasite index: in most parts of the area it had been about 10 per cent. in children and it came down to under 1 per cent. and remained there even during the transmission season. There was a similar gratifying fall in the number of malaria patients and in the loss of working days from the disease.

[It is very puzzling to read of the present occurrence of much malaria and of so high a proportion of *falciparum* infections in Northern Russia. We are probably justified in regarding Pavlovskii's Course on Human Parasitology (in Russian) as a good authority. In his second edition (1934) Pavlovskii states that north of 60° N (i.e. the latitude of Archangel) there is no reason to believe in the possibility of complete development of *Plasmodium* in *Anopheles*. Even a little further to the south he regards infection as only likely to occur in unusual years when several circumstances simultaneously make it possible. Pavlovskii adds that of course Malignant Tertian is restricted to the centre and south of Russia (as indeed one would have supposed). One can only record these contradictions hoping that this veil may be lifted.] *P. A. Buxton*

NEWBOLD C L A Sea Head for Coastal Swamp Drainage
Caribbean Med J 1943 v 5 No 1 30-34 1 diagram

The author describes a self clearing drainage outlet from coastal swamps which have a ground level about that of high tide. This device has worked satisfactorily in Trinidad where the tidal range is two feet in the neap and four feet in the spring tides and in Grenada where tidal ranges are about half those of Trinidad. If there are several drains or lagoon outlets they may be collected into one long reservoir ditch parallel to the shore and one sea drain and head put in the most favourable position. If the outfall can be arranged behind a reef in quiet tidal water there is no problem it will remain clear. Usually a sandy bay is the only place for the discharge. In such conditions the invert at the distal end of the land drain should be six inches above mid tide level and that drain should have a fall of 1 or 2 in 1 000. The drain ends in a check chamber on the land side of the beach bank. In the check chamber there is a vertical drop of six inches into the sea drain which should have a fall of at least 10 in 1 000. The total fall of the sea drain is one foot. The sea drain ends at a blank wall with an outlet on either side each one half the width of the sea drain. The outer side of the wall or sea head is shaped to turn the incoming waves away from the outlets. The invert of the sea drain is curved. The width of the drain should not be less than two feet and the clearance from the invert to the sea drain cover three feet. Liberal sized openings in the cover at the sea head and at the check chamber facilitate inspection.

Norman White

DAS GUPTA B M & SIDDONS L B The Effect of Indian made Mepacrine Hydrochloride on *Plasmodium knowlesi* *Indian Med Gaz* 1943 Mar v 78 No 3 141-2

With a view to comparing Indian made mepacrine hydrochloride with atabrin four monkeys with *Plasmodium knowlesi* infection were treated with the former. The daily dose of 0.025 gm dissolved in 0.5 cc distilled water was given by intramuscular injection for two or three days. One of the animals with a heavy infection before treatment commenced died the three others recovered. The drug could be seen to have a destructive action on all forms of the parasite which quickly disappeared from the blood. The course of treatment though bringing about immediate recovery did not prevent ultimate relapse. The results correspond very closely with those obtained by CHOPRA and DAS GUPTA (1933) who tested the action of the original atabrin on the same infection [*this Bulletin* 1934 v 31 172].

C M Wenyon

KELSEY F E OLDHAM F K & GEILING E M K Studies on Antimalarial Drugs The Distribution of Quinine in the Tissues of the Fowl *J Pharm & Exper Therap* 1943 July v 78 No 3 314-19 3 figs

The distribution of quinine in the tissues of the fowl is of particular importance because the chicken is susceptible to malaria parasites and is one of the most common experimental creatures for research in antimalarials. The quinine was estimated by the method of KELSEY and GEILING [*J Pharm & Exper Therap* 1942 v 75 183]. After

oral administration of 400 mgm per kgm. there was great variation in the course and height of the blood concentration curve the peak occurring after three to eight hours and the maximum level ranging from 5 to 25 mgm per litre. When repeated doses were given the greater portion of the drug was detoxified each day and little could be found in the tissues 24 hours after the last dose.

When the quinine was given intravenously 10 mgm per kgm the individual variation in the blood curve was much less. For a short time after intravenous injection the concentration of quinine in the red blood cells was slightly higher than in the plasma but after one hour it was the same or lower. The white blood cells (both of fowls and men) show a concentration of quinine much higher than that of the plasma.

Quinine is rapidly removed from the blood by the tissues and much is eliminated by way of the bile.

Concentration of quinine in the tissues of the chicken and rabbit one hour after the intravenous injection of 10 mgm/kg of quinine

Tissue	Chicken (a of 5)	Dog	Rabbit (a of 2)
mg of quinine per kg of tissue			
Blood	3	3	0.3
Liver	22	23	1
Bile	29	10	5
Lung	13	37	54
Kidney	17	14	8
Spleen	21	29	10
Heart	10	8	2
Muscle	5	4	2
Brain	3	3	1

The distribution between the various tissues is shown in the table. The concentrations observed are approximately in inverse ratio to the ability of the tissues of that species to destroy quinine *in vitro*.

F. Hawking

GEHMAN Q. M. *Advances in Malaria Research* *New England J. of Med.* 1943 Aug 19 & 19 v 229 Nos 7 & 8 283-90 324-3 [143 ref.]

TAYLOR Frank H. *Mosquito Intermediary Hosts of Disease in Australia and New Guinea*

This book is reviewed on p. 81

TRYPANOSOMIASIS

FAIRBAIRN H. *The Agricultural Problems posed by Sleeping Sickness Settlements* Reprinted from *East African Agric J.* v 9 p 6 pp

In this interesting article the author who is the Sleeping Sickness Officer in the Medical Department of Tanganyika Territory describes

the methods adopted in forming settlements of natives as a part of the campaign against sleeping sickness, and discusses the problems involved

Before the country became a German colony the native inhabitants lived in large compact settlements for better defence against their enemies these settlements were agricultural clearings where comparative freedom from the tsetse fly enabled cattle to be kept When intertribal warfare had been suppressed by European control dispersal became safer and families became scattered in the bush in these conditions the increased contact with tsetse fly prevented cattle from being kept but did not otherwise interfere noticeably with the life of the people When however sleeping sickness appeared and increased to epidemic proportions comprehensive measures of control became urgently necessary

Dr G MACLEAN who was appointed Sleeping Sickness Officer to deal with the situation estimated that a density of population of 5-25 persons per square mile was the most favourable for the epidemic spread of sleeping sickness but with a density of 50-80 persons per square mile the locality became practically fly free Fairbairn agrees with these figures if they refer to families instead of persons taking an average of 3.3 persons to each family Such a family cultivates about 4½ acres each year

With 80 families to the square mile each would have 8 acres

The author states that it has been proved that an epidemic of Rhodesian sleeping sickness cannot be controlled merely by treating infected persons however thoroughly this is done it is necessary to reduce the contact between man and the tsetse fly and this can only be done by the establishment of large compact settlements which are sufficiently cleared of bush to eliminate all tsetse fly from them This may be done in various ways (1) the people can be removed to open country (2) intervening bush between family groups can be cleared so as to form a single area if there is a sufficiently high density of population (3) scattered families can be collected and settled in a selected area of virgin bush The last method has been the one most frequently adopted in Tanganyika Territory and has been successful

The steps taken to form a settlement are described in detail they include an estimate of the population an agricultural survey of the proposed settlement area and assistance in transport clearing and building The ultimate aim is to have 16 acres of agricultural land available for each family The natives are consulted in the choice of land and their co-operation sought Re settlement is carried out between August and October i.e. after the harvest and before the next year's farming is begun

A 15 ton diesel engined road train was found to be most useful the aged and infirm and the small children together with the household goods were transported to the nearest unloading point of the new settlement Details of numbers mileage costs &c are shown in a table

After settlement efforts were at first directed to increasing the size of the local food crops afterwards other kinds were introduced and finally goats sheep and cattle were brought in The various problems such as preserving the fertility of the soil encouraging the production of clarified butter hides and meat for export from the locality (since these are the only cash crops which can pay the cost of transport) are discussed

These measures bring educational medical and other facilities to the people and lead to better health and greater prosperity

J F Corson

1 LINHARD J. Pri es de sang journalieres et rechutes san eunes dans la trypanosomiase [Daily Examination of the Blood in relation to Blood Relapses in Trypanosomiasis] *Rev Sci Med Pharm et Ve de l'Afrique Fran aise Libre* Brazzaville 1943 Jan. 2 No 1 3-10

11 ——— Valeur de la ponction sternale dans le diagnostic de a trypanosomiase [The Value of Sternal Puncture in the Diagnosis of Trypanosomiasis] *Ibid* 11-15

1 Thick blood films of 73 sleeping sickness patients were examined daily for various periods in order to discover whether the presence of trypanosomes in the peripheral blood occurred in cycles. The number of examinations in different patients varied from 21 to 201. There were 39 patients in the first stage of the disease and 34 in the second stage. The results are given in a table which shows for each patient the number of blood examinations, the number of positive findings and the number of consecutive days in each relapse on which trypanosomes were present. (It is not clear whether the patients were having treatment by drugs during their period of daily examination.)

The results varied greatly, in 12 patients (5 in stage one and 7 in stage two) no trypanosomes were found, but relapses occurred in all the other. Trypanosomes were usually present for not more than a few consecutive days at a time.

The author concludes that there is no cyclical reappearance of trypanosomes in the peripheral blood. The investigation showed that cases of sleeping sickness may be missed when only one blood film is examined as in routine surveys. [These patients were presumably infected with *Trypanosoma ambiense*.]

11 Sternal puncture was performed on 40 sleeping sickness patients without local anaesthesia, a lumbar puncture needle being used. No patient complained of pain. Some received as many as 25 punctures. Examinations of thick blood films of these patients were made at the same time. Trypanosomes were found more frequently in the bone marrow than in the peripheral blood, the ratio being 211/129. They were found in the marrow and not in the blood in 101 examinations but in only 19 examinations were they present in the blood and absent from the marrow. The results are shown in a table.

The author concludes that trypanosomes are more numerous and much more frequently found in the bone marrow than in the peripheral blood. (See also this Bulletin 1938, 35, 704; 1939, 36, 216; 1941, 38, 304.)

J F Corson

CHOUHARA R. Un cas d'ascite à trypanosomes [Trypanosomes in Aseptic Fluid] *Rev Sci Méd Pharm et Ve de l'Afrique Fran aise Libre* Brazzaville 1943 Jan. 2 No 1 16-17

An African child, aged 6 years, showed scrotal swelling repeatedly between April 1941 and July 1942. Examinations made in the course of sleeping sickness infections in March and October 1941 had not

given a diagnosis of sleeping sickness. In July 1942 the child's abdomen rapidly swelled and the scrotum was again swollen also. Six litres of ascitic fluid were removed by tapping and trypanosomes were found in it after centrifugation. Trypanosomes were also found in the blood and superficial lymph glands. The cerebrospinal fluid was normal. [See also this *Bulletin* 1938 v 35 339] J F Corson

FULTON J D & LOPIE W Studies in Chemotherapy XXXIV
Comparison of the Results obtained by Different Methods of
Administration of Drugs in Trypanosomal Infections of Mice
Ann Trop Med & Parasit 1943 Sept 7 v 37 No 2 80-95
[21 refs]

A comparison was made of the results of treatment of trypanosome infections in large numbers of mice with six drugs (tryparsamide reduced tryparsamide thioglycollate novarsenobillon 4 4 diamidino monomethyl stilbene diamidino dimethyl stilbene and 7 amino 9 (p amino phenyl) 10 methyl phenanthridinium chloride) administered by oral subcutaneous intraperitoneal or intravenous routes. The maximum tolerated doses and the minimum curative doses varied according to the method of administration but the influence of this was not the same with each of the different compounds studied. In general the highest amount was tolerated when given by the oral route and the least amount when given by the intravenous route. The best therapeutic indices were obtained by subcutaneous administration. This was because the toxicity of the compound was lower when this route was used than when the intravenous or intraperitoneal methods were employed but the therapeutic efficiency was not much diminished. Local necrosis was often caused at the site of injection. [This is a technical paper which is of much interest for those engaged on chemotherapeutic tests in mice but it cannot be adequately presented in an abstract] F Hawking

TALIAFERRO W H & OLSEN Yelena P The Protective Action of
Normal Sheep Serum against Infections of *Trypanosoma duttoni*
in Mice *J Infect Dis* 1943 May-June v 72 No 3 213-21
[Refs in footnotes]

The protective property of normal sheep serum against the non-pathogenic *T. duttoni* of mice which was first described by Thiroux has been studied by comparing the time at which trypanosomes first appear in the blood of treated mice with untreated controls.

This protective property exhibits the following characteristics. When titrated in a series of mice it may exhibit complete protection in all doses above a minimal effective dose or may exhibit zones of inhibition i.e. alternate protection and partial or no protection. It is generally demonstrable in the serum of sheep over a year old in doses of 0.5 ml or more per 20 gm mouse and is sometimes demonstrable in doses as small as 0.1 ml. It is not diminished in titer after severe injury of the liver due to (1) pregnancy disease or (2) poisoning by carbon tetrachloride except in moribund sheep. It may be temporarily diminished to a slight degree after partial occlusion of the portal vein. It is absent or weak in titer in the fetus and the newborn lamb. It is demonstrable sporadically in a weak titer in lambs.

MAZZOTTI L. & O-ORIO M. Teresa. Experimentos de transmision de *Trypanosoma cruzi* en cuatro especies de Ornithodoros. [Experiments on the Transmission of *T. cruzi* by Four Species of Ornithodoros] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico 1943 June v 4 No 2 163-5 English summary

Experimental infection by *Trypanosoma cruzi* in specimens of *Ornithodoros furcosus* *O. parkeri* and *O. amplus* was obtained. The infection persisted in each species at least during 429, 158 and 195 days respectively.

It was not possible to obtain experimental infection of specimens of *Ornithodoros hermsi* on similar experimental conditions.

MAZZA Salvador with the collaboration of Germinal Basso Redento Basso Miguel E. JORG & Salomon MIRARA. Investigaciones sobre enfermedad de Chagas. Naturaleza histopatológica de reacciones alergicas cutaneas provocadas en chagasicos con lisados de cultivos de *S. cruzi*. [Histopathology of Allergic Cutaneous Reactions to Cultures of *Trypanosoma cruzi* in Chagas's Disease] *Unidad Buenos Aires. Misión de Estudios de Patología Regional Argentina (Jujuy). Publicación No 64* 1943 143 pp 145 fig. [13 refs.]

In 1941 MAYER and PIFANO prepared cruzin from cultures of *T. cruzi* on NNN medium and noted its use in the rapid diagnosis of Chagas's disease (this *Bull.* 1941 v 38 640). The authors of the monograph here reviewed have emulsified cultures of the trypanosome with ground glass in normal saline and after shaking it for six hours have filtered the product through cottonwool paper and a Berkefeld V candle. This filtrate was then dialysed against distilled water. The result is a clear amber-coloured liquid which the authors designate

Lisado-filtrado-dializado A or Lfd and this they used for intra-dermo-reactions injecting 0.1 cc. The immediate result is a papule with pseudopodia and in half an hour a surrounding erythema the diameter of the whole being 1.5 cm. and in 24 hours 2 by 4 cm. then fading to the original size by the fifth day.

The authors have taken portions of the skin by biopsy for histological examination and describe their findings in minute detail and with abundant photomicrographic illustrations. They have similarly described the skin and glands in cases of Chagas's disease presenting also temperature charts and photographs of patients showing Román's sign of palpebral oedema and dacryoadenitis with accounts of the physical condition of fifteen patients. The progressive stages are described: the infiltration of the skin; invasion by leucocytes; degeneration of the cells of the reticular skin; the perivascular infiltration; the nodules of histiocytes; inflammatory cystosteatonecrosis; the hyperplasia and keratosis of chagoma formation. All these are illustrated very clearly: the work is very full and detailed and the reproductions excellent.

H. Ha old Scott

LEISHMANIASIS

ANDERSON T F Kala Azar in the East African Forces *East African Med J* 1943 June v 20 No 6 172-5

In this note the author gives a brief account of 136 cases of kala azar which have occurred in Africans in the Forces in East Africa. The majority of the cases 87 in all were infected near the mouth of the Omo river in the extreme south western corner of Abyssinia north of Lake Rudolf. Of the others 12 appear to have been infected at Archer's Post on the Uaso Nyiro River while 19 were infected on the Nairobi Addis Ababa road in southern Abyssinia. The relatively large number of cases proves that kala azar is much more common in northern Kenya and southern Abyssinia than was previously supposed. In September 1941 Col G MACLEAN found ten cases of clinical kala azar amongst the indigenous native population on the lower Omo and in three of these leishmania were demonstrated by spleen puncture. In the troops whose movements were accurately known it was possible to calculate the mean incubation period as thirteen weeks. In the majority of cases infection occurred during the wet season—April to June. The fatality in the series was 32 per cent but this high figure was largely due to a lack of the most satisfactory remedies.

C M Henson

SEN GUPTA P C A Complement Fixation Test for Kala Azar *Indian Med Ga* 1943 July v 78 No 7 336-9

In 1939 LOWE and GREVAL [this *Bulletin* 1940 v 37 43] in discussing the use of the WITEBSKY KLINGENSTEIN and KUHN (W K K) antigen for complement fixation tests for leprosy (which was first prepared as an aid to the diagnosis of tuberculosis) remarked that in South America BIER had obtained positive complement fixation reactions by its use in 70 per cent of cases of mucocutaneous leishmaniasis. LOWE and GREVAL reported that they had obtained positive results in all of 17 cases of Indian kala azar and in one of three cases of dermal leishmaniasis. GREVAL LOWE and BOSE in the same year [this *Bulletin* 1939 v 36 537] stated that with pooled sera from cases of kala azar they had obtained positive results with a serum dilution of 1:25 and a doubtful result with dilution of 1:50 while GREVAL SEN GUPTA and NAPIER with a slightly modified technique found that the reaction was positive in all proved cases of kala azar with a dilution of 1:100 and that it was a diagnostic procedure of high order [this *Bulletin* 1939 v 36 1030].

The author of the present paper has continued observations on the test and employing the technique of Greval Sen Gupta and Napier has found that in tests carried out on 434 patients with various diseases a positive result was obtained in 172 (97 per cent) of 177 cases of diagnosed kala azar. The result was negative in all the other cases except in one of chronic tuberculosis. The test is however also liable to be positive in severe leprosy which cannot be confused with kala azar. It was positive in 21 of 22 cases of parasitologically diagnosed kala azar which were of such short duration that the aldehyde test was negative. One of these patients gave a history of one month's illness only. With treatment and recovery the reaction tends to

become negative. The conclusion is that the test is highly specific for kala azar being negative in all disease conditions likely to be considered in the differential diagnosis C M Henyon

BRAHMACHARI P N Post Kala Azar Infection of the Skin by *Leishmania donovani* *Indian J Med Res* 1942 Oct v 30 No 4 485-92 13 fig on 1 pl. [20 refs.]

The author discusses that peculiar cutaneous leishmaniasis which most usually follows recovery from kala azar whether as a result of specific treatment or not.

The disease was named by its discoverer UPENDRA NATH BRAHMACHARI dermal leishmanoid and the present author devotes a considerable part of his paper to arguments for the retention of this name or the term Brahmachari's disease.

He notes that the condition has been recorded only from India but he suggests that careful search will probably reveal it in other localities where kala azar occurs.

The lesions of the skin which are found in this condition are erythematous patches depigmented patches papules and nodules. Leishmania are rarely found in the skin in the first two of these lesions. In the others they may be abundant. They are found in dermal melanophores the large extravascular cells with small nuclei and a large amount of cytoplasm the cells constituting the walls of the newly formed blood vessels in the granulation tissue cells with branching processes in the deeper layers of the dermis monocytes neutrophils and giant cells. In his discussion of the possible reasons for the development of leishmania in the skin after their eradication from the internal organs as a result of treatment the author visualizes surviving parasites seeking shelter in the skin after having been expelled from the viscera by the immune bodies. [This rather suggests that the leishmania are endowed with powers of intentional movement though they are known to be quite non motile. As a matter of fact it is quite unnecessary to suppose that after or during treatment leishmania invade the skin for they are already present there sometimes in large numbers. In some kala azar areas excision of portions of skin has been advocated for the purpose of making smears for the diagnosis of kala azar. Actually it is admitted that some cases of dermal leishmanoid occur in persons who have recovered naturally from kala azar. It is only necessary to assume therefore that during the process of recovery from this disease changes may occur in the skin which favour the development of leishmania already there. It is quite unnecessary to assume that leishmania like rats can be driven from one hiding place to another.] C M Henyon

- 1 NAPIER L E & SEN GUPTA I C The Treatment of Kala Azar with Diamidino-Di Phenoxy Pentane Preliminary Observations on the Treatment of 32 Cases *Indian Med Gaz* 1943 Apr '78 No 4 177-83 4 charts. [12 ref.]
- 2 INDIAN MED GAZ 1943 Apr v '78 No 4 201-2 Treatment of Kala Azar the Present Position

1 The authors commence their paper by stating that the drug is one of the aromatic diamidines synthesized by EWING in 1939 and found by LOURIE and YORKE [this *Bulletin* 1940 v 37 404-405] to

have a curative action in *Trypanosoma rhodesiense* infection in rabbits and *Babesia canis* infection in puppies. It was successfully used in a small number of cases of visceral leishmaniasis in man by KIRK and MACDONALD [*ibid* 1941 v 38 261] KIRK and SATI [*ibid* 1941 v 38 573] and ADAMS [*ibid* 1942 v 39 172]. HUMPHREYS [*ibid* 1942 v 39 749] used it in two cases of oropharyngeal leishmaniasis with successful results. It has been found to be satisfactory in the treatment of sleeping sickness by SUNDERS [*ibid* 1942 v 39 532]. ADLER and TCHERNOMORETZ [*ibid* 1942 v 39 748] found that in Syrian hamsters infected with *Leishmania dono* anti repeated injections of 3 to 5 mgm per kgm of body weight controlled light infections but that for heavier infections 20 mgm per kgm of body weight was not as effective as 2 mgm of diamidino stilbene.

The authors now report the results of their treatment with the drug of 32 cases of kala azar in Calcutta. The ages of the patients varied from 1 to 40 years. They were classified into 2 groups—ordinary cases in which no treatment or only inefficient treatment had been carried out and resistant cases which had failed to be cured by a full course of usually efficient antimonial treatment. In adults the dosage adopted was usually 0.025 gm for the first injection, 0.05 gm for the second, 0.075 gm for the third, and then daily increases of about 15 to 20 mgm till the maximum dose of 1 mgm per pound of body weight was reached. The maximum dose was then continued to the end of the course. The injections were given intravenously in 1 per cent solution in distilled water. If the resting systolic blood pressure was below 100 mm of mercury, an injection of adrenaline (0.25 cc of a 1 in 1000 solution) was given hypodermically before the dose of the drug.

The results of the treatment were that of 21 ordinary cases 19 were cured while of the 11 resistant cases 10 were cured. In one of the ordinary cases and in the one uncured resistant case death from complications occurred while in the second uncured ordinary case the drug was entirely unsuccessful, treatment with neostibosan being substituted.

It is admitted that it is not yet possible to state how many of the cured cases are permanently cured—in fact one of the cured ordinary cases subsequently relapsed. As regards the immediate reactions to the injection of the drug these were much less severe than those following the injection of diamidino stilbene. The authors conclude that diamidino-diphenoxy pentane has a well marked anti kala azar activity.

11 In the same number of the *Gazette* in which the paper reviewed above is published will be found an Editorial initialled by the second author. In this is discussed the present position of the treatment of kala azar from the point of view of aromatic diamidines. It is noted that diamidino stilbene has the most powerful therapeutic action against kala azar but unfortunately produces immediate reactions in the majority of cases and troublesome neuropathic sequelae in some cases which are unpleasant to the patient and sometimes alarming to the physician. Though these are entirely curable and the immediate reactions avoidable by the use of adrenaline they preclude the use of the drug in an outpatient clinic. Again though diamidino-diphenoxy pentane is more benign in its action it is less effective as a curative agent. On the other hand it has been found in India that the pentavalent antimony compounds cure about 95 per cent of the cases and are noted for their ease of administration and the

extreme rarity of unpleasant reactions. In the Sudan the antimonials appear to have been less successful. It is concluded that as far as India is concerned the large majority of cases will continue to be treated and cured with the antimonials diamidino stilbene being reserved for the antimony resistant cases which cannot otherwise be cured.

C M Wenyon

ADAMS A. R. D. Studies in Chemotherapy XXXV A Case of Indian Kala Azar treated with Propamidine (4-4-Diamidino Diphenoxy Propane) *Ann Trop Med & Parasit* 1943 Sept. 7 v 37 No 2 96-7

In previous papers ADAMS and YORKE and ADAMS [*this Bulletin* 1940 v 37 No 1941 v 38 260 1942 v 39 172] have recorded the successful treatment of three cases of Indian kala azar two with stilbamidine (4-4-diamidino stilbene) and a third with pentamidine (4-4-diamidino diphenoxy pentane). In the present paper the author describes the treatment of a fourth case of Indian kala azar in Liverpool with propamidine (4-4-diamidino diphenoxy propane).

The case was typical of the disease and treatment was carried out by the daily injection for nine days of 100 m.m. (roughly 2 mgm. per kilo of body weight) of the drug. After the injections there was a sharp rise of temperature to as much as 104 F on the first four days of treatment thereafter the rise was less marked till it remained at 101 F finally falling to normal two days after the last or ninth injection. The injections were not followed by any fall in blood pressure such as occurred after pentamidine.

In the present case when two successive injections were made into the same region of the deltoid a hard painful lump formed. It did not suppurate but was commencing to diminish in size only when the patient left hospital a month later. A single injection into the opposite deltoid produced a smaller swelling of only a week's duration. The remaining injections were given deeply into different regions of the buttocks and were not followed by any trouble. The patient left hospital apparently cured thirty five days after the commencement of treatment.

C M Wenyon

GOODWIN L. G. & PAGE J. E. A Study of the Excretion of Organic Antimonials using a Polarographic Procedure *B. Ch. M. J.* 1943 July v 37 No 2 198-209 5 figs. 40 refs.]

By means of a rapid polarographic method the authors have studied the excretion of certain organic antimonials—tartar emetic antihomarine tibophen (trivalent group) tibacetin tibamine glucoside neostibosan urea stibamine and sodium antimony gluconate (quinquevalent group)—after injection into laboratory animals and in the case of three of the compounds—tibophen stibamine glucoside and sodium antimony gluconate—after injection into human beings. The results show that 30 to 40 per cent. of the antimony content of tibophen or one of the quinquevalent compounds is excreted by mice in the urine during the first 1 or 2 hours following the injection. The initial outflow is not so high in the case of tartar emetic and antihomarine. After about 3 hours it was no longer possible to detect measurable amounts of antimony in the blood. The antimony excreted during the first 24 hours after injection of tri- or quinquevalent compounds

was of unchanged valency. After the injection of sodium antimony gluconate part of the antimony remaining in the body was in the trivalent state showing that reduction had occurred. Trivalent antimony was recovered from the livers of injected animals. It was demonstrated that quinquevalent antimony was reduced by living tissues in culture.

The observations recorded indicate that though a large proportion of the quinquevalent non-toxic compounds are rapidly excreted by the kidneys still in the quinquevalent state some at least is retained in the body and is reduced to the trivalent state and though proof of this is difficult to obtain it may be as has generally been assumed that the quinquevalent compounds are leishmanicidal only after reduction in the body. *C M Wenyon*

[In Hack's Chemical Dictionary the polarograph is defined as an instrument which records the movements of a galvanometer by means of the image produced on a revolving drum of light sensitive paper by a beam of light reflected from a mirror attached to the galvanometer needle. It records photographically minute changes in the intensity of a current that is due to applied voltage in electrolysis with a dropping mercury cathode. —*Ed*]

DAVER M B & AHMED S S. The Occurrence of Oriental Sore in the Hyderabad State. *Indian Med Ga* 1943 June v 78 No 6 296-7

During a nutrition survey of children in Pattan and Jalna in the Hyderabad State it was noted that many showed single and multiple sores or scars of healed sores on exposed parts of the body and microscopical examination of a number of these showed that the condition was oriental sore. *Leishmania tropica* being found in aspirated material. The prevalence of the disease is shown by the fact that of 1 262 boys and girls examined 79 were affected. *C M Wenyon*

FEVERS OF THE TYPHUS GROUP

LEÓN A P & APDACA F. Aglutininas para los *Proteus* O\19 y O\K en el suero de personas normales y enfermos de tifo exantemático de México. Su valor diagnóstico e importancia epidemiológica. [The Agglutination of *Proteus* O\19 and O\K in the Serum of Normal Persons and in Cases of the Typhus Fever of Mexico. The Importance of the Reaction in Diagnosis and Epidemiology]. *Rev Inst Salubridad y Enfermedades Trop* México 1943 June v 4 No 2 95-126 8 graphs & 1 fig [20 refs] English summary (8 lines)

The chief findings in this extensive investigation are briefly summarized in the following tables —

PLÖTZ H WOODWARD T E PHILIP C B BENNETT B L & EVANS K L. Endemic Typhus Fever in Jamaica, B.W.I. *Amer J Pub Health* 1943 July v 33 No 7 812-14

Endemic typhus fever is generally believed to be common in the West Indies though there are few reports of the occurrence of any form of typhus in the island. This is the first report of endemic typhus in Jamaica. During five months in 1941-42 68 probable cases were seen among natives living in rat infested houses in Kingston. In 33 hospital patients the Weil Felix reaction was positive but a rash was seen in only 7 cases. The complement fixation test to an endemic Rickettsial antigen was positive in all the cases. In a few cases there was also a positive reaction to epidemic antigen but always at a lower titre. Unsuccessful attempts were made in a few cases to isolate the Rickettsiae. A suspension made from 13 fleas caught on rats from the homes of some of the patients caused a sporadic low fever in a guinea pig which later was found to be immune to endemic Rickettsiae. All the fleas were *Xeropsylla cheopis*. A similar result was obtained with a mixed suspension of flea lice and mites caught on the rats.

The findings are regarded as suggesting that the ectoparasites of the rats transmit the infection.

John B D Mercer

MAZZOTTI L & VARELA G. Infección natural del gato con tifo en México. [Natural Infection of the Cat with Typhus in Mexico.] *Med Circa Mexico* 1943 June v 23 No 438 229-30

CIRCA BALTEANT and CONSTANTINCO [this Bulletin 1935 v 32 365] infected domestic cats by feeding them with the organs of infected guinea pigs. LEFINE and LORANDO [this Bulletin 1936 v 33 46] found cat naturally infected during an epidemic of typhus in Athens. Infected fleas were found on the animals.

The present authors examined two cats belonging to a hospital in which were some typhus patients. The serum of the cats agglutinated *Proteus OX19* in dilutions of 1:80 and 1:40 respectively. Their brain tissues were injected intraperitoneally into rats and six days later the rat brain tissue was transmitted to guinea pigs. This transmission from one of the cats produced fever and periorchitis in guinea pig with abundant intra- and extracellular Rickettsiae in the tunica vaginalis.

The author concludes that the domestic cat may become naturally infected with typhus of murine type and play a part as a temporary reservoir in the epidemiology of the disease.

J F Corson

BRICENO-IRAGORRY L. Formas clínicas del tifo exantemático en Venezuela. [Clinical Forms of Typhus in Venezuela.] *Boletín Oficial Sanitaria Panamericana* 1943 May 22 No 5 403-5

The first mention of exanthematic typhus in Venezuela was in March of 1926. Then in 1938 1939 1940 and 1941 studies of the disease were made by several doctors and cases were reported in various localities. The diagnoses in these cases were confirmed by the Weil Felix reaction. The clinical forms of typhus in Venezuela may be reduced to two the first being called Guacarapa fever which to date has not been very well studied but is probably similar to Rocky Mountain spotted fever and the second being known as benign endemic or rat borne typhus. The rat borne character of Venezuelan

onstrated by the Weil Felix reaction in the blood as well as in rats of the Caracas area and by experimentally completed) of isolation of the rickettsia in the brains

SCHER G T L & MITCHELL HEGGS G B Endemic typhus in Diego Suarez Madagascar *Brit Med J* 1943 8

mic is used by the authors in its more legitimate sense of occurrence of the disease In North America epidemic typhus is widely used as a synonym of flea borne typhus and misunderstanding is likely to arise The cases now described are of special interest because the 11th Report for 1940 stated that fevers of the typhus group in Madagascar

No louse infestation could be detected in any of the patients but all had been bitten by insects shortly before the onset Rat fleas were possible vectors The local dogs were tick infested

The onset was sudden in five and gradual in five cases There was continuous high fever lasting 14 days the symptoms as described were those of a fever of the typhus group of varying severity A maculopapular rash was seen in six of the cases It appeared first on the chest and flanks In two cases it was restricted to the chest and limbs in another it extended to the face in the remaining three it was generalized It first appeared on the 4th 5th or 6th day in five cases and on the 9th day in the sixth

The Weil Felix reaction was positive in rising titre in all the cases it was of the *Proteus O\19* type except in two in one of which the titre (1-800) was equally high for *O\2* and in the other it was equally high for *O\4* (1-200) Except for the last mentioned case the titre for *O\19* was 1-400 or over at some stage High titres were rather late in appearing in four cases tested on the 11th and 12th days the titres were 1-100 1-100 1-40 and 1-400 respectively In five tested between the 14th and 19th days inclusive a titre of 1-800 was reached in one In all the four cases tested between the 22nd and 27th days this titre was reached it was still maintained in four of seven tested between the 30th and 47th days

Animal experiments could not be carried out so that no opinion is expressed with regard to the vector or animal reservoir

There was evidence that the disease is endemic in Diego Suarez [on the coast] and probably elsewhere in Madagascar

John W D Megaw

TOPPING N H HEILIG R & NAIDU V R A Note on the Rickettsioses in India *Pub Health Rep Wash* 1943 Aug 6 v 58 No 32 1208-10

Sera from three cases of sporadic typhus fever in India seen recently by Heilig and Naidu at Mysore were submitted to the complement fixation test at the National Institute of Health U S A Bengtson's technique was employed All the sera reacted more strongly to antigen of the Rocky Mountain spotted fever type than to antigens of epidemic or endemic typhus types The causal agent was therefore regarded as being most closely related to the Rickettsiae of the first named disease

The highest titres observed apart from trace reactions were —

	Rocky Mountain fever antig	Endemic typhus tissue	Endemic typhus tissue
1	+++1-3 d +115	+1-4	+++1-4 and ±1-4
2	+++1-36 d +++1-51	±1-4	+++1-4 d ±1-
3	+++1-36 and ±1-51	+++1-4 a d +116	+++1-4 d ±1-

Cross fixation at lower dilutions with endemic typhus antigen has also been observed in some cases of Rocky Mountain fever but is not common.

These findings are of great interest they should be read in conjunction with two previous papers by Heilig and Naidu (see this *Bulletin* 1942 v 39 375 and 827). In the first of these papers four cases were described and the diagnosis of endemic tropical typhus was made. In the second paper ten more cases were reported and the opinion expressed was that they resembled Boyd's 12 group clinically related to Indian tick typhus. In the opening sentence of the present paper reference is made to an article by the reviewer in 1921 in which a tick was implicated as the vector in a case of typhus like fever in India. In that article the view was expressed that the fever was identical with or closely related to Rocky Mountain spotted fever and that it might be found to be widely distributed in India and elsewhere in the world. It is to be hoped that workers in India and other countries will be able to carry out complement fixation and Rickettsia agglutination tests with a view to differentiating between cases of the various fevers of the typhus group. Neither guinea pig inoculation nor the Weil-Felix reaction has proved satisfactory in this respect.]

John W. D. McArthur

READING B & BLINT H. Clinical Observations on Spotted Fever in the Gulf Coast Area of Texas. *Amer J Trop Med* 1943 July v 23 No 4 445-9 4 fig

Brief clinical accounts are given of four fatal cases of spotted fever in children whose ages ranged from ten months to seven years.

The authors' suspicion that *Amblyomma americanum* may be a vector of the disease is rather belated owing to the seven months delay in the publication of the paper. R. R. PARKER and his colleagues have shown that this tick is a vector and they have also referred to two of the present cases [this *Bulletin* 1943 v 40 35]. Another suggestion is that some of the cases of endemic typhus which are being reported in increasing numbers in the Gulf-Coast area of Texas may really be spotted fever.

The rash in all four cases appeared within one or two days of the onset. In three cases it was seen first on the extremities and then extended all over the body including the palms and soles. It rapidly became petechial or extensively haemorrhagic. In two cases *Proteus O119* was agglutinated 1:320 in the others the reaction was negative but the patients died on the 9th and 10th days. The leucocyte count in one case ranged from 3000 to 15000 in another from 2800 to 4000 per cmm. No reference is made to the counts in the other cases.

Tick infestation is mentioned in three cases. In one of the cases a specimen of *Dermacentor variabilis* was found on the body. The *Rickettsia* isolated from one patient was found by ANIGSTEIN and BADER [this *Bulletin* 1943 v 40 386] to give cross immunity with *R. ricksetti*.

John W. D. Megaw

MAGALHAES O. Tifo exantemático neotrópico (no Brasil). Propriedades neurotópicas do vírus [Neotropical Exanthematic Typhus (In Brazil). The Neurotropic Properties of the Virus] *Brasil Medico* 1943 Mar 20-27 v 57 Nos 12-13 103-7 7 figs & 4 charts

This paper deals specially with the pronounced neurotropic properties of the virus of tick borne typhus of the Brazilian type.

No mention is made of the arthropod vector and anyone who read the paper without knowing that it referred to tick borne typhus would be quite likely to regard it as a description of the nervous symptoms of louse borne typhus. Although no reference is made to the striking similarity in the neurological features of the two diseases this is so obvious from the author's description and from the photographs that a detailed summary of the article is unnecessary.

[The author has made a large number of interesting contributions to the literature of tick borne typhus as seen in Brazil. In a paper in English he used three different names to designate the disease now he has adopted yet another name as being more suitable. The word exanthematic forms a part of all the four names and adds to the confusion that must exist in the minds of uninitiated readers. The Brazilian disease differs in no essential respect from the tick borne typhus like fever known as Rocky Mountain spotted fever this again has so many points of resemblance to the other tick borne fevers of the typhus group except perhaps Q fever that the desirability of adopting a uniform group name is obvious. Till a better name is proposed my long standing suggestion of tick typhus seems to be suitable this can be followed by a subtitle to indicate the variety of the disease that is referred to.]

John W. D. Megaw

MAGALHAES O & ROCHA A. Sensibilidade dos morcegos ao vírus do tifo exantemático neotrópico no Brasil [Susceptibility of Bats to the Virus of Neotropical Exanthematic Typhus (Tick borne)] *Brasil Medico* 1943 May 1-8-15 v 57 Nos 18-19-20 207-10

ARAGAO in 1936 showed that bats might harbour the tick *Amblyomma cajennense*. This observation suggested to the author that bats might possibly be reservoirs of infection of *Rickettsiae* which might therefore be conveyed to distant places and transmitted to human beings by the ticks. Dogs or cats which devour the bats might serve as agents for the transport of the ticks or as intermediate reservoirs of infection.

One strain of the *Rickettsia* was found to be pathogenic to the bats *Histiotus velatus* and *Hemiderma perspicillatum* causing typical lesions. Infection was transmitted from the infected bats by inoculation of brain suspensions into guineapigs.

A vampire bat *Desmodus rotundus rotundus* was not found susceptible to this strain of the *Rickettsia*. Two other strains of the *Rickettsia* gave negative results with all three species of bats.

The method of testing was intraperitoneal inoculation of the bats with suspensions of brains of infected guineapigs.

An emulsion of the salivary glands of one of the inoculated vampire bats was injected intraperitoneally into a guinea pig which developed splenomegaly but attempts at passage of the infection failed

John W D Meas

DAVIS G E The Tick *Ornithodoros rudis* as a Host to the Rickettsiae of the Spotted Fevers of Colombia Brazil and the United States
Pub Health Rep Wash 1943 July 2 v 58 No 27 1016-20

Specimens of *Ornithodoros rudis* experimentally infected with the spotted fever of Colombia were used to establish infection in guinea pigs

Some of the original ticks and the progeny of one of them were employed in 16 attempts to transmit infection from guinea pig to guinea pig by biting. From 6 to 75 ticks were used in each test but without success. All but three of these lots of ticks were found to harbour infection in their tissues. This was demonstrated by inoculating guinea pigs with suspensions of the ground up ticks.

Similar results were obtained when tests of the same kind were made with two lots of ticks infected with Brazilian spotted fever and with two lots infected with Rocky Mountain spotted fever.

In one of the experiments on the Colombian strain the progeny of infected ticks were found to harbour infection. This was an unexpected finding because the progeny of ticks which are unable to transmit infection by biting are not usually infected.

O. r. rudis was found to harbour the infection of Colombian fever for 343 days; it harboured infection of Brazilian fever for 191 days and of Rocky Mountain fever for 243 days though it was not capable of transmitting infection by biting in any case. John W D Meas

DAVIS G E Experimental Transmission of the Spotted Fevers of the United States Colombia and Brazil by the Argasid Tick *Ornithodoros parkeri*
Pub Health Rep Wash 1943 Aug 6 v 58 No 32 1701-8 3 figs

By a series of experiments in which large numbers of guinea pigs were used it has been shown that the tick *Ornithodoros parkeri* can transmit by feeding the causal agent of the spotted fevers of the USA Colombia and Brazil.

The progeny of infected ticks transmitted infection by feeding even in some cases in which the mother tick had failed to do so.

In the case of the USA fever the progeny of infected ticks were infective to the fourth generation. In the case of the Colombian fever they were infective to the second generation and in the Brazilian fever to the first generation.

Transmission was effected by larvae throughout the nymphal stages and by males and females. One female was infective 994 days after the infective feeding in the second nymphal stage. The interval between the original infective feeding and the transmission of infection by the progeny of the fourth generation was 1333 days in one case. The virulence of the infection was fully maintained over this period typical fever being caused in 17 guinea pigs of which seven showed scrotal oedema.

Ticks that had fasted for one year and their progeny were found to be still infective.

O parkeri may therefore play a part in maintaining the infection in natural conditions and may occasionally be a vector to man

John W D Megaw

DENGUE

FINDLAY G M & BROOKE FIELD R W A Fever of the Dengue Group occurring in West Africa *Trans Roy Soc Trop Med & Hyg* 1943 Sept v 37 No 2 95-109 6 charts [17 refs]

Short fevers resembling dengue have been reported from time to time in West Africa especially in the coastal area In 1870 GORE referred to epidemics of dengue in Sierra Leone reports since 1913 refer only to small outbreaks or sporadic cases of short fevers which were seldom regarded as being dengue

The present observations deal with small outbreaks and sporadic cases of a short dengue like fever occurring in Europeans and Africans in various localities in Nigeria and the Gold Coast

The fever lasted from 2 to 10 days and often was of the saddle back type There were vague pains referred to the muscles bones and joints enlargement of the lymph nodes and a measles like rash coming out from the second to the sixth day Mice guinea pigs rabbits bush rats and various monkeys were not susceptible to inoculation with the blood of patients The disease was transmitted to two human volunteers by subcutaneous injection of 1.0 cc of serum taken from a patient on the second day of the fever Blood taken from one of these volunteers on the third day of the fever and injected into a third volunteer caused only fleeting rises of temperature to 99.7° and 99.8° on the fifth and sixth days after inoculation

Two African volunteers in Nigeria were inoculated with blood taken on the fifth day of a patient's illness and two others with blood taken on the third day there was no response in any case

All blood cultures and serum agglutination tests were negative Mice inoculated with the serum of convalescents were not protected against infection with the viruses of Rift Valley fever Bwamba forest fever and West Nile fever Mixture of the viruses of these fevers and convalescent serum kept for two hours at 37° C retained their infectivity for mice

The total leucocyte count varied from 4,400 to 8,000 [the days of the disease are not stated] there was a relative increase in the lymphocytes on the fourth day

Attacks in Europeans were rather more severe than those in Africans the backache was more pronounced and the rash appeared later in the former

The disease resembled dengue in most of the clinical symptoms and in all the experimental findings but it was regarded as differing in the absence of break bone pains and in the occurrence of enlargement of the lymph nodes It closely resembled the *fièvre rouge* of the Belgian Congo

[This report is of special importance because of the thorough manner in which the cases were investigated Although the authors refer to certain points in which the disease was regarded as differing from classical or true dengue they have wisely refrained from suggesting

that these differences justify a claim to the isolation of a new disease. They only go so far as to suggest that a number of different diseases may have been called dengue. This is probably true but it is also true that in many outbreaks of classical dengue enlargement of the lymph nodes and absence of break bone pains have been noted so that there are grounds for making an alternative suggestion that there are several varieties of dengue which differ from each other because of variations in the strain of the virus, the susceptibility of the affected communities and the conditions in which transmission occurs. Similar variations occur in the related virus disease yellow fever. There need be no quarrel with the authors' decision to call the disease a dengue like fever. If other observers would follow their example we should be spared the infliction of a flood of new diseases with unsuitable names.

John B. D. Macfarlane

WOODLAND J. C. McDOWELL M. M. & RICHARDS J. T. Bullis Fever (Lone Star Fever—Tick Fever). An Endemic Disease observed at Brooke General Hospital Fort Sam Houston Texas. *J. Amer. Med. Ass.* 1943 Aug 21, 122 No 17 1156-60 1 chart

The authors give a full and clear account of a fever which in their opinion is a new disease entity heretofore undescribed.

They saw 33 cases during the spring and summer of 1942 among soldiers engaged in field exercises at Camp Bullis near Houston Texas. All the patients had multiple tick bites by *Amblyomma americanum* shortly before the onset. The fever lasted 3 to 7 days in 27 cases, 8 days in 2, 9 days in 2, 11 and 13 days respectively in the remaining two.

The onset was abrupt. Most of the patients had post-orbital or occipital headache. The fall was by lysis; there was no further rise in temperature except in a few instances in which an occasional rise to 99 F was observed. Convalescence was protracted especially in severe cases. All the patients had enlargement of at least one set of lymphatic gland. General adenopathy was common. The throat was slightly red and injected.

In the more severe attacks (10 per cent) a maculo-papular rash was seen on the trunk early in the course of the fever. In some cases this was like the rash of endemic typhus; in others like that of German measles. It never lasted more than 48 hours.

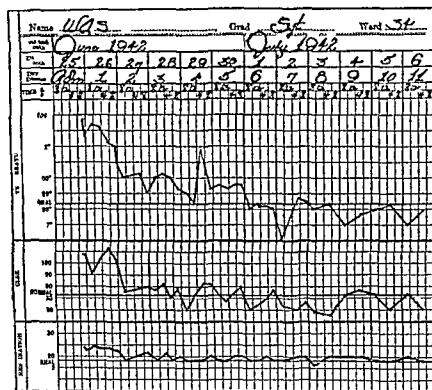
There was pronounced leucopenia on the second or third day; the total count fell to 3,000 in many cases; in one case it was 1,750. There was an associated neutropenia. The blood of six patients was tested at the National Institute Laboratory; completely negative findings were reported for fevers of the typhus group, undulant fever, tularemia, typhoid and paratyphoid A and B.

Inoculation tests on guinea-pigs, rabbits and chick embryos were carried out at the Command Laboratory but no causal agent was disclosed. Several of the guinea-pigs had a mild transient fever on the ninth day after intracerebral inoculation with cerebrospinal fluid; others had similar fever on the 9th or 10th day after intraperitoneal inoculation with blood. One guinea-pig inoculated intracerebrally with pooled suspension of 150 ticks collected at the camp had a temperature of 106 F on the ninth day. R. F. Maxcy, N. H. Toppin and J. C. Snyder visited the hospital and saw some of the patients.

they are stated to have tentatively suggested the name tick bite fever and to have expressed the opinion that the evidence was highly suggestive of a tick borne infection [The name tick bite fever has already been earmarked for tick borne typhus in South Africa]

The authors exclude Colorado tick fever [see this *Bulletin* 1941 v 38 694] by the absence of a saddle back type of fever and by the occurrence of lymphatic enlargement They exclude dengue by the absence of exposure to mosquitoes and by the clinical course of the disease They state that 485 further cases have been seen in May and June 1943 and that one of these patients died of agranulocytic anaemia with sepsis

[Although classical mosquito borne dengue can be excluded on epidemiological grounds the clinical features of Bullis fever do not seem to differ in any essential respect from those of dengue or for that matter from those of Colorado tick fever Variations in such features as lymphatic enlargement and the occurrence of a two phase type of fever are observed in different outbreaks of dengue and there is no reason why they should not also occur in the clinically similar diseases in Colorado and Texas It will be seen from the chart which is the only one reproduced in the article and which is stated to be from a typical case that it shows two phase type of fever curve this chart



Temperature pulse and respiration charts in a typical case of Bullis fever observed at the Brooke General Hospital Fort Sam Houston Texas

[Reproduced from the *Journal of the American Medical Association*

and the reference to occasional secondary rises suggests a tendency to the occurrence of the single relapse so often seen in dengue and occasionally also seen in the related disease sandfly fever The descriptions of Bullis fever and Colorado tick fever tempt the reviewer to speculate

on the possibility that both diseases may turn out to be primarily a zoonotic fever transmitted by a tick and belonging to the dengue group. If this guess should be correct the name tick dengue would deserve serious consideration in preference to a place name which is certain to be misleading. No tick-borne fever is likely to be the monopoly of one locality.

John W. D. McArthur

PLAGUE

PUBLIC HEALTH REP Wash 1943 Apr 16 v 58 No 16 640-45
 Plague Infection reported in the United States during 1942 in Human Beings

One case of human plague was reported in the United States in 1942. The patient was a child living in California. Plague infection was reported in rats, wild rodents, or their ectoparasites in six western states—California, Idaho, Montana, Nevada, Oregon, and Washington—and details are given on the 150 instances in which investigation produced positive results. The animal found infected, or from which infected ectoparasites were obtained, were the ground squirrel, jack rabbit, marmot, chipmunk, mouse, pack rat, cottontail rabbit, brush rabbit, gopher, and badger. The infected ectoparasites included fleas, lice, and ticks.

The reports are not claimed to give a complete picture of the infection of field rodents, but they demonstrate the continuance of a wide distribution of plague infection in western United States.

Charles W. Leocks

GIRARD G. Sensibilité des bacilles pesteux et pseudotuberculeux d'une part des germes du groupe coli dysentérique d'autre part aux bactériophages homologues. [Sensitiveness of Plague and Pseudotuberculosis Bacilli to Bacteriophages of the Coli Dysentery Group] *Ann Inst Pasteur* 1943 Jan-Feb v 69 No 1-2 52-4

Girard, with other French authors, has not subscribed to the identification of plague and pseudotuberculosis bacilli with the Pasteurella group of organisms [this *Bulletin* 1943 v 40 139]. In the present communication, as a result of experiments with phages on strains of plague and dysentery, he suggests that we are dealing with a single phage active on the two species plague and dysentery, or with two phages having reciprocal activity on these same organisms. That, however, does not justify any contention that the organisms of plague and dysentery have anti-emic characters in common; indeed the reverse seems to be the case as judged by serological and immunity tests. Meanwhile the phenomenon remains without a solution, nor does it mean that phage is any less valuable for the identification of the plague bacillus because it has been deprived of some of its specificity. In the discussion which followed BLANC agreed with Girard that the plague bacillus ought not to be placed in the group of Pasteurella, not only because the lytic principle of the plague bacillus is not transmissible to the Pasteurellas, but also because a Pasteurella instead of multiplying in the rat flea *Xenopsylla cheopis* is destroyed in less than 24 hours.

W. F. Harvey

PRINCE F M Report on the Fleas *Opisocrostis bruneri* (Baker) and *Thrassius bacchi* (Roths) as Vectors of Plague *Pub Health Rep* Wash 1943 July 2 v 58 No 27 1013-16 1 fig

The Public Health Authorities of America are distinctly concerned over the possibility of spread of sylvatic plague from the Western States in which it is now present to the Eastern States which are still free. Examination into this problem takes one of two lines—that of the suitability of the host animal and that of the vector flea. In 1941 plague was found in each of four lots of fleas collected from Richardson's ground squirrels (*Citellus richardsoni richardsoni* (Sabine)) of Divide Country N Dak. It was the first finding of plague in the Plains States. The fleas collected from these squirrels were *Opisocrostis tuberculatus tuberculatus* *O. labis* *Oropsylla rupestris* and *Thrassius bacchi*. The first three species had been previously proven to be possible plague vectors and the last is now examined by the author along with *Opisocrostis bruneri*. Large numbers of these two fleas have been collected from Richardson's, Franklin's and 13 striped ground squirrels. Guinea-pigs were the test animals and control experiments were duly set up. Both the fleas proved to be vectors of plague after feeding on guinea-pigs with plague bacteraemia. When the results are compared with those obtained with the rat flea *Xenopsylla cheopis* and with *Diamanus montanus*, the flea of the Californian ground squirrel which are highly efficient vectors, it became evident that *O. bruneri* and *T. bacchi* may be regarded as equally capable vectors. The final conclusion reached is that a continuous chain of fleas capable of the transmission of plague and of hosts which have been found infected or of others which are very probably susceptible to infection extends from the Rocky Mountain States and Western North Dakota in which plague prevails to the States east of the Mississippi River.

W F Harvey

JACHOWSKI L Jr The Oriental Rat Flea (*Xenopsylla cheopis*) in Michigan [Research Notes] *J Parasitology* 1943 Aug v 29 No 4 300

The first record of the finding of this flea on a rat in Michigan

BOMBAY REPORT OF THE HAFI INT INSTITUTE FOR YEARS 1940 AND 1941 37-45 Antiplague Serum Sulphathiazole and Sulphapyridine in the Treatment of Bubonic Plague [SOKHEY S S & WAGLE P M]

In the field trials on which this study of plague treatment is based it was found that the most important single factor deciding the issue was the development and degree of septicaemia. If no septicaemia occurred spontaneous recovery usually took place but the contrary was the case if septicaemia did occur. The grade of septicaemia was called mild or severe according as 0.25 cc of blood gave less or more than 10 colonies on culture. Control of dosage to maintain the blood concentration of the drug used was effected by making estimations every 4, 6, 8 and 24 hours after the first dose and then once daily. Some observations are made on the selection of cases. No selection was practised: patients were taken in strict succession for one of the forms of treatment but as some cases were excluded from the survey of results because of death within 12 or 24 hours of admission totals are not all equal. Other cases left hospital against advice while still

febrile. The pneumonic plague cases only 10 in number are dealt with separately. As septicaemia seldom developed after treatment had once started the truest picture of results would be obtained if only those cases are considered which had septicaemia at the time the treatment was started. These field trials apply to the testing of the comparative curative value of Haffkine Institute antiplague serum, sulphathiazole, sulphapyridine and sulphathiazole cum antiplague serum. Various doses were given but that which came to be adopted was (1) Sulphathiazole 10 gm the first day and 7.5 gm per day for some four to five days and a small dose later giving a concentration of 5-10 mgm per cent. (2) Sulphapyridine 8 gm the first day and 3-4 gm per day during the next four days giving also a concentration of 5-10 mgm per cent. The case mortality in all field trial with treatment by antiplague serum, sulphapyridine, sulphathiazole, sulphathiazole cum antiplague serum and iodine intravenously (controls) was 23.5, 27.0, 20.8, 20.0 and 53.6 per cent respectively. The same figures for cases with plague septicaemia at the time of commencement of treatment were 69.0, 74.2, 55.4, 38.1 and 96.4. Treatment did not save any of the pneumonic cases.

H. F. HARRY

INDIAN RESEARCH FUND ASSOCIATION RESEARCH ADVISORY BOARD FOR YEAR 1ST JAN TO 31ST DEC 1942 54-9 Plague Researches under the Director Haffkine Institute Bombay

Treatment of plague with sulphonamide-group substances is under trial. A small number of cases have been treated (1) with sulphathiazole (2) sulphathiazole plus antiplague serum and the results are compared with each other and a no treatment control. The efficacy of sulphathiazole seems to be evident and an increase of that efficacy when antiserum is added is at least suggested by the figures. Clinically a marked advantage was noticed in favour of the combined treatment.

Another research of high importance has proclaimed a definitely greater protective power of living avirulent immunogenic vaccine over killed vaccine. That view has been held now for some time by OTTEN for his Tjwideoj smooth strain and by GIRARD and ROBIC for their E.V. strain. A great advance will have been made when as is here asserted it is proved possible to obtain a plague strain at will with the combined properties of avirulence and immunogenic power. The two do not necessarily go together. In fact continued subculture may result in complete loss of the immunogenic power. The comparative measurements of the 25th subculture of strain 53H show it to be much more immunogenic than Tjwideoj Smooth or E.V. strains. Its mouse protective dose requires only 875 organisms as compared with 800 000 for both the other strains. When comparison is made of the living 53H/25 strain with killed vaccine (heat at 54°C) the same difference is apparent. The mouse protective dose is 0.001 cc for the living strain and 0.0065 cc for the heat killed vaccine.

Another investigation has been directed to the relative values of agar and broth vaccines. The advantage which originally lay with the agar vaccine only because it could be more rapidly prepared has now been lost for it is now possible to produce as good a broth vaccine with a three day growth as an agar vaccine and broth vaccine is

obviously easier to make. The three day growth broth vaccine also gets over a former objection to its use—its toxicity.

W F Harvey

MACCHIAVELLO A Sobre a peste no Nordeste Brasileiro (Resposta ao Sr Marcello Silva Junior) [Plague in North Eastern Brazil (Reply to Marcello Silva Junior)] *Brasil Medico* 1943 Jan 2-9 16-23-30 & Feb 6-13 & 57 Nos 1-2 3-4-5 & 6-7 pp 6-9 31-4 46-9 [13 refs]

JUNIOR M da S Sobre a peste en el Nordeste Brasileiro (Tropical ao Sr Macchiavello) [Plague in North Eastern Brazil (Reply to Macchiavello)] *Brasil Medico* 1943 Feb 20-27 Mar 6-13 Apr 3-10 17-24 May 1-8-15 22-29 June 5-12 & 19-26 & 57 Nos 8-9 10-11 14-15 16-17 18-19-20 21-22 23-24 & 25-26 pp 70-74 89-92 187-4 193-5 214-15 235-7 254-6 275-9 6 fig

CHOLERA

INDIAN RESEARCH FUND ASSOCIATION REP SCIENT ADVISORY BOARD FOR YEAR 1ST JAN TO 31ST DEC 1942 1-4 Cholera Treatment Enquiry under the Director School of Tropical Medicine Calcutta

This is a very condensed technical report of research work which merits abstraction from the full publications themselves. Experimentation with abundant animal and *in vitro* control shows the value of treatment of cholera with sulphaguanidine. The dosage was 5 gm on admission and 2.5 gm every four hours until 20 gm in all had been given. Green dyes of the type of brilliant green and malachite green are also effective against cholera vibrios both *in vitro* and *in vivo*.

Vibrios usually disappear from the stool in 2-3 days on administration of 1/2500 dilution of brilliant green. Other researches were directed to the preparation of pyrogen free distilled water for intravenous injections and to the isolation of vibrios from cholera stools and Hooghly water by the candle boric peptone water method by direct plating on the bile salt agar and Wilson and Blair's solid media respectively. Interesting notes are included of bacteriological studies of *V. cholerae* and non agglutinating vibrios which refer especially to (1) the purity of type obtained by single colony isolation (2) survival of vibrios in river water (3) invasiveness and toxicity (4) skin reactions obtained with non specific bacteria in cholera cases and (5) the common antigenic structure of the non agglutinating vibrios isolated at the beginning of the disease with some divergence of structure in the later stages. Some miscellaneous studies complete the report.

W F Harvey

INDIAN RESEARCH FUND ASSOCIATION REP SCIENT ADVISORY BOARD FOR YEAR 1ST JAN TO 31ST DEC 1942 4-8 Enquiry to determine the Endemic Foci of Cholera in certain parts of Bengal and Madras Presidencies under Dr K C K E Raja Offg Deputy Public Health Commissioner with the Government of India

Cholera endemicity had been established previously for the districts of Tanjore Trichinopoly and South Arcot. As the figures published

[is secondary to some infection outside the alimentary canal] may cause about a third and the remaining cases are due to alimentary or climatic causes

Treatment with sulphonamides has been used in the Hadassah Municipal Hospital at Tel Aviv since the late summer of 1941 and this account refers to 344 cases mostly in infants aged 6-8 months. 290 were treated with ultraseptyl (sodium sulphamethylthiazole) 54 with sulphaguanidine and the remainder received sulphapyridine or sulphanilamide or both. There were 196 cases with toxic symptoms (toxicosis) and 148 without. Of the former 23 (11.7 per cent) died of the latter only 5. Before the use of sulphonamides a 50 per cent mortality in toxic cases was regarded as normal. Sulphathiazole was found to be more effective than sulphaguanidine in toxic cases owing probably to its being more readily absorbed. Both drugs showed an anti-diarrhoeal action unequalled by any drug hitherto used, sulphaguanidine being the better in this respect: the stools became formed and normal in appearance within 3-4 days in most cases, food tolerance rapidly improved and after a week the infant could take its ordinary food. The dosage was 0.1 gm or less per kgm of body weight *per diem* and administration was rarely continued for more than 4-5 days.

Diet—After one day of fasting the following diet was usually given: infants under 3 months old got sugared buttermilk, older children sugared rice gruel with one third heavy or sour milk (lemon or orange juice being used as acidifier); after a few days this was replaced by mashed cheese meat or one of the other mashes.

The author is a colleague of Dr Meyer at the same hospital and writes on the effect of sulphonamide treatment on the infant mortality curve. Infantile diarrhoea is the cause of the so-called summer peak of the infant mortality curve and this peak disappeared after the introduction of sulphonamide treatment: the following table shows the effect in toxic cases—

Year	Cases of toxicosis	No. of deaths	Mortality per cent
1940	16	93	57.4
1941	150	67	38.3
1942	17	4	13.0

A reduction in the number of deaths from pulmonary diseases also took place but there was no change in the mortality from other causes.

J. F. Corson

MANSON BARR Philip. *The Dysenteric Disorders. The Diagnosis and Treatment of Dysentery, Sprue, Colitis and other Diarrhoeas in General Practice.*

This book is reviewed on p. 80.

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

SAWITZ W G & HAMMERSTROM R J The Statistical Significance of a Negative Stool Examination in the Diagnosis of Amebiasis *Amer J Hyg* 1943 July v 38 No 1 1-7 2 figs

In this paper the authors discuss the determination of the probability that an individual on whom a negative result has been obtained in examination for *Entamoeba histolytica* infection is actually negative and they present formulae which they consider sufficient to enable such probability to be calculated. They state that they have found that this probability depends on the true efficiency of the technique used in examining a group of individuals and the true prevalence rate of infection in the group

C M Henyon

MACHADO L M A amebiose intestinal no consultorio do ginecologista [Intestinal Amoebiasis in Gynaecological Practice] *Brasil Medico* 1943 Mar 20-27 v 57 Nos 12-13 165-8

The author in this article is not concerned with *E. histolytica* as the cause of lesions of the female genitalia. His aim is to demonstrate three types of case: (1) Patients with complaints which they attribute to the genital apparatus but which on examination are found to be due solely to amoebiasis while the genital system and adnexa are quite normal. (2) Patients with similar complaints due in part to genital lesions and in part to chronic intestinal amoebiasis of the existence of which they were completely ignorant. (3) Patients with complaints referred to the genital system who on examination are found to have amoebiasis which is the cause of their symptoms and at the same time silent pathological conditions of the genital system.

It is necessary to bear in mind as all gynaecologists do that the sexual apparatus plays a large part in the life of a woman and that she is prone to ascribe to the genital organs any disturbance of the lower part of the abdomen and many of her psychical aberrations.

The author in his gynaecological practice has studied and analysed 3500 cases (excluding all obstetric cases). Of this total 432 (12.3 per cent) had for some reason or other faecal examination made and 146 (33.7 per cent) showed *E. histolytica* that is 4.1 per cent of the total 3500 were chronic passers of the protozoon. From the clinical symptom complaint point of view he divides the patients into seven groups namely those with: (1) Pain in both iliac fossae with or without intestinal disturbance—34 cases. (2) Pain in the left iliac fossa with or without intestinal disturbance—28 cases. (3) Pain in the hypogastrium with intestinal disturbance—28 cases. (4) Pain in the right iliac fossa with intestinal disturbance—23 cases. (5) Pain in one or both iliac fossae and intestinal disturbance in patients who had undergone appendicectomy—10 cases. (6) Periodic intestinal disturbance with or without emaciation—13 cases. (7) Patients whose faeces were examined as part of a general systematic examination—10 cases.

From the point of view of the gynaecologist he divides his findings into six categories—

(1) Patients with normal genital apparatus whose symptoms though imputed by them to the genitalia were due to amoebiasis. Of

GURFVITCH J. Rare Findings of Intestinal Parasites. Harefuah Jerusalem 1943 Aug 15 v 25 No 4 [In Hebrew 63-4 English summary 64]

Five cases of *Isospora belli* are reported. Together with a previously reported case six cases of this intestinal parasite are now known in this country. The question of the pathogenicity of *Isospora belli* is discussed.

A case of Balantidiasis probably the first in this country is reported.

RELAPSING FEVER

DIXON K C. The Spirochæma of Cyprian Relapsing Fever. J Path Bact Med Micros 1943 Aug v 81 No 2 89-92

A description of the results of inoculation of guinea-pigs with a spirochæte obtained from a case of tick borne relapsing fever in an Indian soldier in Cyprus, one of a series of cases among the troops. Three guinea-pigs and one rat were infected with the strain and each of the three guinea-pigs successively infected after 4 to 12 days incubation showed a severe infection with spirochaetes numerous in the blood for at least 3 weeks. The rat showed only a mild infection.

The transmitting host is said to be most probably *Ornithodoros tholozani* and from the author's description the spirochæte would seem to be a strain of *Spirochaeta hispanica*. E. Hundle

DAVIS G L. Species Unity or Plurality of the Relapsing Fever Spirochaetes. J Parasitol 1943 Sept 33 v 33 Part 1 No 18 1943 417-421. Summary taken from Rev. Applied Entomol. Ser. B 1943 Sept v 31 Pt 9 176-77.

The author reviews various criteria that have been used for the differentiation of relapsing fever spirochaetes: staining reactions, cross immunity tests, protection or neutralisation tests and pathogenicity for different hosts, and shows that none of these is satisfactory. He then discusses the value of the specific relationship between spirochæte and tick for this purpose. In experiments carried out since 1934 with some 1600 individuals of *Ornithodoros hermsi* Wheeler, *O. tholozani* Dugès and *O. parkeri* Cooley from various parts of the United States and spirochaetes from each species no tick transmitted spirochaetes derived from either of the other two species. On the other hand a species from one locality never failed to transmit the spirochæte from the same species from another locality. There was 30-100 per cent transmission of spirochaetes derived from ticks of the same species. Anomalous results were obtained in 1940 with *O. parkeri* from California and *O. turicata* which transmitted spirochæte from each other although there was an indication that the association between *O. parkeri* and the spirochæte from *O. turicata* (*Spirochaeta turicata*) was transient. To explain this an account is given of cross breeding experiments with these two species which indicated that a hereditary factor determines the transmission of strains of spirochæte.

and that some of the California ticks used in the 1940 experiment were probably hybrids. In these experiments a virgin female of *O parkeri* paired with a male of *O turicata* and seven progeny were reared to the adult stage. One of the females which engorged in the fourth nymphal stage on a mouse infected with a *parkeri* strain of spirochaetes transmitted the infection three times when adult. Four females from this series mated with *O turicata* and gave rise to larvae that failed to transmit spirochaetes. In the nymphal stages many of these engorged on rats infected with *parkeri* and *turicata* strains of spirochaetes respectively and subsequently transmitted these spirochaetes.

O rudis Kar ch from South America, *O erraticus* Lucas (maroccanus Velu) and *O moubata* Murr from Africa and *O tholozani* Lab & Megn (*papillipes* Bir) from the Russian Union were then used in transmission experiments with strains of spirochaetes from the three North American ticks. *O rudis* and *O erraticus* failed to effect transmission but *O tholozani* transmitted *turicata* spirochaetes to a guinea pig and *O turicata* effected 90 per cent transmission after feeding on the guinea pig infected by *O tholozani*. However later tests of the same batch of *O tholozani* on white mice were negative. *O moubata* transmitted *hermsi* and *parkeri* spirochaetes but adults that had acquired *hermsi* spirochaetes as nymphs were dwarfed and failed to oviposit after engorgement and mating while although transmission of *parkeri* spirochaetes was effected up to and including the adult stage only four females out of 12 oviposited. The progeny were given three successive feedings with negative results. Spirochaetes of the *parkeri* strain were present in the coxal fluid of females that failed to transmit when tested the second time. It is generally accepted that in *O moubata* transmission is effected through the coxal fluid.

Injection experiments showed that spirochaetes survived longer in the species of tick from which the strain was derived than in others in which they were however shown to persist for some days. Nicolle & Anderson had demonstrated by injection the persistence of a tick borne strain of spirochaetes in lice but the lice did not effect transmission by feeding.

The nomenclature of spirochaetes is discussed and it is concluded that the results of the experiments described suggest that each species of *Ornithodoros* that is a vector of relapsing fever carries a spirochaete that is tick host specific and that this relationship offers a more accurate approach to the differentiation of spirochaetes than any of the several criteria used up to the present. The names *Spirochaeta hermsi* and *S parkeri* are therefore proposed for the spirochaetes carried by *O hermsi* and *O parkeri* respectively [See also this *Bulletin* 1943 v 40 782]

LEPROSY

INDIAN RESEARCH FUND ASSOCIATION REP SCIENT ADVISORY
BOARD FOR YEAR 1ST JAN TO 31ST DEC 1942 46-53 Leprosy
Enquiry under Dr R G Cochrane at the Lady Willingdon Leprosy
Sanatorium Chingleput Madras

Some of the work recorded in this report has already been abstracted in this *Bulletin* 1943 v 40 151. The following additional points are of

SALVENDERS G M & GIFFEN H K The Skin Lesions of Neural Leprosy in the Virgin Islands of the United States *Internat J Leprosy* Manila 1942 Dec 1 10 Spec War No 38 50 14 fig on 4 pls

In the course of the field study of leprosy in the Virgin Island (see foregoing abstract) there were found 37 lepromatous 58 active neural and 32 quiescent cases. Microscopical examinations were made in 23 early neural cases with one or more skin lesions and in seven patients in whom a diagnosis of neural leprosy had been made in 1934 detail of these are recorded. In 23 of the 30 cases well defined tuberculoid changes were found in unusually large proportion. They were consistent with a diagnosis of leprosy although in none of the 30 cases were leprosy bacilli met with. Clinically they were well established cases of tuberculoid leprosy. Five of the seven patients first studied in 1934 showed no visible evidence of leprosy in 1940 this illustrates the well known tendency of such mild neural cases to recover spontaneously owing to the marked resistance to the disease and its slow progress in that class of case. Recoveries of a number of the remaining 23 cases may be expected within the next few years. *L R 6ers*

KEAN B H & CHILDRESS M E A Summary of 103 Autopsies on Leprosy Patients on the Isthmus of Panama *Internat J Leprosy* Manila 1942 Dec 1 10 Spec War No 51-9 [10 refs]

The examinations reported on by the authors were carried out at the Ancon hospital in 1904-41 they form 57 per cent of the total deaths from leprosy and include microscopical examinations in nearly all of them. In 82 the official cause of death was given as leprosy but an analysis of the records shows that 24 could be attributed to tuberculosis 22 to neuritis 15 to leprosy 10 to heart disease 4 to cancer 17 to seven other common causes of mortality and the remaining 11 as many other diseases. The average age of recorded onset of the disease was 36.7 years and the average age at death 47.1 years. There was a high incidence of cirrhosis of the liver gall stones and nephritis and the naso-pharynx or upper or outer portion of the upper respiratory system as most affected as compared with the larynx and trachea or lower portion of the upper respiratory system in tuberculosis. *L Ro ers*

DHARMENDRA & JAİKARIA S S Studies of the Lepromin Test Results of the Test with various Antigens in Non Contacts *Leprosy in India* 1943 Apr 1 15 No 2 40-45

This article reports further attempts to find a diagnostic allergic skin test for leprosy through the use of a specific antigen of the leprosy bacillus on the line of the lepromin reaction. What is wanted is an antigen which will give no reactions in persons who have always lived in an area free or practically so from leprosy but which gives positive reactions in mild early neural leprosy in which there is most need of differentiation. The various fractions of lepra bacilli separated by the Calcutta workers (see this *Bullet n* 1942 1 39 228 855) were therefore tested in places in the Punjab plains where leprosy incidence is extremely low. Although none of them proved to be specific for leprosy yet the nucleo-protein extracted from the bacilli by the phosphate buffer method gave the fewest reactions in Punjab subjects only 5 per cent

were positive when the dose injected was limited to 0.002 mgm a dose that gives positive results in most neural leprosy cases. The investigation is therefore being continued. *I. Rogers*

INDIAN RESEARCH FUND ASSOCIATION RFP SCIENT ADVISORY BOARD FOR YEAR 1ST JAN TO 31ST DEC 1942 44-6 Leprosy Enquiry under Dr John Lowe at the School of Tropical Medicine Calcutta

This report deals almost exclusively with the lepromin researches already abstracted in this *Bulletin* 1942 v 39 226 227 228 1943 v 40 316 and 317

PITT L. A. Estudio electrocardiografico en cincuenta enfermos de lepra [Electrocardiographical Study in Fifty Lepers] *Rev Argentina de Dermatosisifilogia* 1943 June v 27 No 2 258-68

In 50 cases of leprosy of various forms no electrocardiographic changes were seen which could be attributed to leprosy.

Charles H. Wilcocks

DOULL J. A. & BRIAN Eunice I. Natural Antitoxin in Blood of Leprosy Patients in Puerto Rico. *Internat J Leprosy* Manila 1942 Dec v 10 Spec War No 60

In this brief note the authors record finding in the blood of 22 leprosy patients in various stages of the disease less than 0.002 unit of diphtheria antitoxin in one case from 0.01 to 0.1 in two from 0.1 to 1.0 in 14 and more than 1.0 unit in the remaining five patients. These amounts are substantial and show no such deficiency as to indicate treatment with diphtheria antitoxin or toxoid. *I. Rogers*

SCHUJMAN S. & MERCAU R. Treatment of Leprosy with Diphtheria Toxoid. *Internat J Leprosy* Manila 1942 Dec v 10 Spec War No 61-7 1 pl

This is a careful detailed report of 11 cases of leprosy treated with diphtheria toxoid. 10 lepromatous and 1 tuberculoid in type the latter included for comparison. Spontaneous improvement in other than lepromatous disease makes it important that for a test of the value of any new treatment only lepromatous cases should be used. Clinical and bacteriological examinations were made every two weeks but at no time in the course of five months was any improvement observed for three remained stationary and the other eight became evidently worse with the appearance of new lesions and increase in the numbers of the leprosy bacilli. *I. Rogers*

FAGET G. H. & JOHANSEN F. A. The Diphtheria Toxoid Treatment of Leprosy. Final Report. *Internat J Leprosy* Manila 1942 Dec v 10 Spec War No 68-78 3 pls

This is a full report on an impartial and carefully controlled trial of this treatment at Carville U.S.A. National Leprosarium with tabulation of the 35 treated cases and of controls. [For the preliminary report see this *Bulletin* 1942 v 39 698.] Doses gradually increased from 0.5 to 3 cc were given every two weeks at first and continued

in 1 cc doses at monthly intervals up to one year. Tests showed that the leprosy patients as a group had a higher diphtheria antitoxin content in their blood than control healthy adults and that they were all Schick negative. Moreover a substantial increase in the titre developed during the treatment so there is no evidence that their diphtheria antitoxin neutralized the toxins of leprosy. The final evaluation of the treated cases showed 3 improved 8 stationary and 24 worse against respectively 3 14 and 18 in the control group. Sedimentation tests and changes in general health as shown by the weight of the patients both yielded figures in favour of the control series. Leprosy reactions were increased by the treatment as was the occurrence of severe leprosy neuritis. The unanimous conclusion of the staff of the leprosarium was that diphtheria toxoid is productive of no good and is fraught with danger for the patient with leprosy.

L. Rogers

CARPENTER C M ACKERMAN Helen & ASHENBURG N J. The Failure of Diphtheria Toxoid to Influence the Course of Experimental Murine Leprosy. *Internat J Leprosy* Manila 1942 Dec 1 10 Spec War No 79-81

Owing to difficulty in evaluating any treatment in such a chronic disease as human leprosy the authors have tested the diphtheria toxoid treatment on 29 white rats infected with two murine strains in which both strains produced similar disease usually within 2 to 3 months. It is unnecessary to give full details of the experiments because the treatment completely failed to influence the character of the lesions the course of the disease or the length of time the animal survived after inoculation whether the toxoid was injected early or late in the course of the disease. In view of the data recorded in the above three papers which are in conformity with a number of other recent reports it must regretfully be recognized that there is no pathological or clinical basis to support the diphtheria toxoid treatment.]

L. Rogers

MUIR E. Treatment of Perforating Ulcer of the Foot. *Leprosy Review* 1943 July 14 No 49 51-3

This paper records recent experience of the author in treatment of both superficial and deep perforating ulcers of the foot the latter being complicated by necrosis usually of a metatarsal bone. In the superficial ulcers in addition to antiseptic dressing infiltration of 1 to 2 cc of hydrocarpus oil into the surrounding subcutaneous tissue may be of use. When bone necrosis is present operative measures which should not be too conservative are necessary to ensure permanent healing. Metatarsal ectomy is indicated through an incision in the sole beginning at the ulcer and extending the whole length of the affected bone. After removal of the bone the sides of the ulcer should be dissected out the wound trimmed and the edges undercut to enable them to be brought together and deep sutures applied. The wound usually takes three or four weeks to heal and crutches should be used for four more weeks to keep the foot off the ground until the fibrous tissue has consolidated. Improvement in the general health follows when exercise can be taken.

L. Rogers

DAVEY T F Leprosy Control in the Owerri Province Fourth Annual Report on Control Work undertaken by the Staff of the Native Administration Leprosy Settlement Uzuakoli *Leprosy Review* 1943 July v 14 No 2 54-64

This report gives an encouraging account of anti leprosy work in a Nigerian Leprosy settlement During 1942 15 out patient clinics were opened bringing the number around the central colony up to 44 over 11 000 patients were treated every week with the help of educated leprosy inspectors and male nurses trained at the headquarters In addition 14 model leprosy villages have been constructed on land provided by the native chiefs and 20 more are under construction at the cost of the people In these the infectious cases are voluntarily isolated and treated those requiring hospital attendance are sent to the central settlement where over 35 000 dressings were supplied during the year That work is the basis of the systematic control of leprosy in the province which includes house-to-house surveys to detect and isolate the infectious persons and to treat regularly the earlier cases at the clinics from which several hundred patients have already been discharged recovered For example in one such area the third survey revealed only 40 new cases among 7 000 people all of them in an early amenable stage of the disease the highly infective patients are isolated in the model villages and the disease is thus under considerable control and should very greatly decrease within a few years The success of these measures is thus demonstrated but unfortunately the staff of two missionary doctors with several Toc H and other lay workers is too small to enable many urgent requests of the people for extensions of the work to be undertaken until increases are made in the post war period when sufficient staff and funds should enable the most serious leprosy problem of the British Empire outside India to be tackled with every hope of success

L Rogers

ROGERS L Progress in the Control of Leprosy in the British Empire *Internat J Leprosy* Manila 1942 Dec v 10 Spec War No 87-95

The work dealt with has already been recorded in this *Bulletin*

DHARMENDRA What the People should know and do about Leprosy *Leprosy in India* 1943 Apr v 15 No 2 46-56

HELMINTHIASIS

ROMEU CANÇADO J Incidence of Intestinal Parasites in a Tropical Area of Brazil Figures based on the Examination of the Stools of 2 500 Patients *Amer J Digestive Diseases* 1943 Mar v 10 No 3 98

This is a continuation of the work reviewed in this *Bulletin* 1942 v 39 5 In the examination of the faeces of 2 500 persons from Bello Horizonte and its neighbourhood the author used concentration

method (of Hoffmann Pon and Janer de Rivas or Faust) in most cases. The commonest protozoa and worms were —

<i>E. laevis</i>	10.4 per cent
<i>G. d. t. s.</i>	10.0
<i>Trich. tr. h. a.</i>	20.5
<i>A. n. l. c.</i>	19.5
<i>N. ca. a. r. a. s.</i>	14.6
<i>St. o. gyl. d. t. cor. lis.</i>	8.6
<i>S. h. st. s. n.</i>	4.0

Charles Wilcocks

BALDWIN E. An *in vitro* Method for the Chemotherapeutic Investigation of Anthelmintic Potency. *Parasitol.* 1943 July, 35, No. 3, 89-111. 11 figs. 29 refs.

The author describes a method for testing the potency of anthelmintics and other compounds on segments of the whole body of *Ascaris lumbricoides* of the pig which are cut off transversely from the rest of the worms. Two such segments are used. One is the anterior end of the worm as far back as 2 cm from the anterior tip; this portion contains the nerve ring and its ganglia which lie about 1.5 mm behind the anterior tip. The second segment called the intermediate preparation is the portion of the worm between points about 3 mm and 2.8 cm in front of the genital pore; this portion is regarded as being a nerve-muscle preparation free from nerve ganglia. Both segments contain portions of the intestine, the anterior one containing the muscular oesophagus.

These preparations are ligatured off with fine sewing silk before they are cut away; the posterior ligature is attached to a hook at the bottom of a small test chamber; the anterior ligature is attached to the recording lever of a kymograph which records the movements of the segment as it works against a load of 0.25-1.5 gm (usually 0.5-0.75 gm).

The test chamber is surrounded by a water bath kept at 38-39°C through which pass the supply pipes which lead to it either the solution or suspension of the compound to be tested or the saline medium in which the normal reactions are recorded. This medium was devised by the author and he was able to keep *Ascaris* alive in it for 10-11 days but used for his experiments only healthy looking females which had not been in the laboratory longer than 48 hours. An ingenious arrangement allows for the rapid emptying of the test chamber and its filling with a test compound and also for a lower flow used for washing the worm segments after they have been mounted. The test chamber is small in order to economize the use of the compounds tested. A diagram of the apparatus explains its action.

The normal movements of the worm segments were first recorded and analysed. These records were then compared with records taken under similar conditions when the test chamber was filled with solutions or suspensions of 25 anthelmintic and other compounds. The concentrations used were mostly from 1:1000 to 1:5000. The results of these are compared with those obtained by earlier workers who also used some of the compounds tested by Baldwin. These workers have used whole *Ascaris*, tied-off pieces of *Ascaris* and pieces of *Ascaris* muscle. Some of them have used earthworm muscle for such tests but Baldwin's test of earthworm muscle shows that its reaction to some powerful drugs are very different from those of segments of whole *Ascaris* body. Very low concentration of adrenaline, pilocarpine and acetylcholine for example powerfully affect earthworm

muscle but are among several drugs which have no effect on Baldwin's segments of *Ascaris*. Among these inactive drugs are cocaine, morphine, strychnine and three sulphonamides. The only recognized anthelmintics among them are filix mas, pelletierine, gentian violet and phenothiazine. The two former are not used for nematode infestations and gentian violet is used only for infestations with *Enterobius*. The reasons for the failure of phenothiazine are being investigated.

The active compounds tested produced different reactions in the two kinds of worm segment. Compounds acting chiefly on the anterior segment containing the nerve ring and ganglia were santonin, arecoline hydrobromide, coumarin, amyral and chlorbutol. References in the literature to the variable action of santonin are discussed. In concentrations of 1:50,000 it paralysed the anterior segments in a few minutes; none of the other compounds tested had anything like this effect. Baldwin has also found [*Pharmaceut J* 1943 July 17] that Beta santonin derived from Indian species of *Artemisia* had a similar but much weaker effect, while a pseudo santonin of unknown nature from the same source had no effect. On the intermediate segments santonin itself at a concentration of 1:50,000 has no effect, but at a concentration of 1:5,000 it causes marked stimulation. Baldwin thinks that santonin stimulates the hinder part of *Ascaris* to some extent but suppresses the coordinating impulses from the nerve ring and ganglia so that the worm is more easily expelled by the host especially if a purgative is given. The other compounds tested which acted on the anterior segments appeared to do so in a similar way but required much higher concentrations (1:1,000). The activity of the tapeworm remedy arecoline hydrobromide is interesting in contrast with the inactivity of the other tapeworm remedies filix mas and pelletierine.

Compounds acting on both the anterior and intermediate segments are more numerous. They include such well known anthelmintics as hexylresorcinol which was most active of them all, beta naphthol, thymol, nicotine, oil of chenopodium, carbon tetrachloride, tetrachlorethylene and dichlorobutane. For details of the differences between the actions of these compounds the paper must be consulted.

Baldwin's results agree with those of LAMSON and BROWN [this *Bulletin* 1936 v 33 577] who used whole *Ascarids* for their tests. His results indicate that anthelmintics do not all act in the same way. Much more knowledge of nematode physiology is necessary before their mode of action can be explained. His method has, he says, the limitations inherent in any *in vitro* method and it cannot be used to test drugs which act otherwise than on the neuromuscular mechanism, but it is economical of materials, does not require exceptional skill, gives a visible record of the effects of compounds tested and can be used to obtain approximate quantitative data. It is useful for the detection of promising compounds which should be tested later on infested hosts. [Since Baldwin's paper was written a large number of new compounds have been made and tested by this method.] G. Lapege

MARILL, F. G. Recherche des Mollusques fluviatiles autour de grands barrages d'Algérie. [Snails in the Streams around the Great Dams of Algeria.] *Arch. Inst. Pasteur d'Algérie* 1943 June v 21 No 2 65-82 2 maps. [Refs in footnotes.]

As a great extension of irrigation has been planned in Algeria the question of an increase of breeding places of snails of the genus

muscle but are among several drugs which have no effect on Baldwin's segments of *Ascaris*. Among these inactive drugs are cocaine, morphine, strychnine and three sulphonamides. The only recognized anthelmintics among them are filix mas, pelletierine, gentian violet and phenothiazine. The two former are not used for nematode infestations and gentian violet is used only for infestations with *Enterobius*. The reasons for the failure of phenothiazine are being investigated.

The active compounds tested produced different reactions in the two kinds of worm segment. Compounds acting chiefly on the anterior segment containing the nerve ring and ganglia were santonin, arecoline, hydrobromide, coumarine, amylal and chlorbutol. References in the literature to the variable action of santonin are discussed. In concentrations of 1:50,000 it paralysed the anterior segments in a few minutes; none of the other compounds tested had anything like this effect. Baldwin has also found [*Pharmaceut J*, 1943, July 17] that Beta santonin derived from Indian species of *Artemisia* had a similar but much weaker effect, while a pseudo santonin of unknown nature from the same source had no effect. On the intermediate segments santonin itself at a concentration of 1:50,000 has no effect, but at a concentration of 1:5,000 it causes marked stimulation. Baldwin thinks that santonin stimulates the hinder part of *Ascaris* to some extent but suppresses the coordinating impulses from the nerve ring and ganglia so that the worm is more easily expelled by the host, especially if a purgative is given. The other compounds tested which acted on the anterior segments appeared to do so in a similar way, but required much higher concentrations (1:1,000). The activity of the tapeworm remedy arecoline hydrobromide is interesting in contrast with the inactivity of the other tapeworm remedies, filix mas and pelletierine.

Compounds acting on both the anterior and intermediate segments are more numerous. They include such well known anthelmintics as hexylresorcinol, which was most active of them all, beta naphthol, thymol, nicotine, oil of chenopodium, carbon tetrachloride, tetrachlorethylene and dichlorobutane. For details of the differences between the actions of these compounds the paper must be consulted.

Baldwin's results agree with those of LAMSON and BROWN [*this Bulletin* 1936, v. 33, 577] who used whole *Ascarids* for their tests. His results indicate that anthelmintics do not all act in the same way. Much more knowledge of nematode physiology is necessary before their mode of action can be explained. His method, as he says, the limitations inherent in any *in vitro* method and it cannot be used to test drugs which act otherwise than on the neuro-muscular mechanism, but it is economical of materials, does not require exceptional skill, gives a visible record of the effects of compounds tested and can be used to obtain approximate quantitative data. It is useful for the detection of promising compounds which should be tested later on infested hosts. [Since Baldwin's paper was written a large number of new compounds have been made and tested by this method.] G. Lapage

MAFILL F. G. Recherche des Mollusques fluviatiles autour de grands barrages d'Algérie [Snails in the Streams around the Great Dams of Algeria]. *Arch. Inst. Pasteur d'Algérie* 1943, June, v. 21, No. 2, 65-82, 2 maps. [Refs. in footnotes.]

As a great extension of irrigation has been planned in Algeria, the question of an increase of breeding places of snails of the genus

Bulinus and a prevalence of bilharzia is has to be considered. The author therefore investigated the conditions in the neighbourhood of two large dams—that of Loum el Cuel—and that of the river Ksob which are used for irrigation. He searched the streams and the networks of canal at both places but found no molluscs. Analyses of samples of water taken from various parts of the systems indicated that the water was too acid or insufficiently alkaline to allow *Bulinus* to live, but it was observed that it became more alkaline towards the terminal canals of the network.

The author remarks that his observations were incomplete and need verification.

J. I. Coles

DELLA, A. Une épidémie de bilharziose intestinale à Lemfu (Congo Belge) en 1923. An Epidemic of Intestinal Bilharzia at Lemfu Belgian Congo in 1923. *Arch. Soc. Méd. de Méd. Trop.* 1942 Dec. 31, 5, No. 4, 236.

The author recalls an outbreak in children attached to a mission. The eggs of *Schistosoma* were found in the stools of most of the patients. It is noted that the symptoms closely resembled those of dysentery, the faeces containing blood and mucus. In a pool in which the children frequently bathed were found snails closely resembling *Lymnaea stagnalis* and tentatively named *J. kassaiensis* by De Meis.

In discussion SCHWITZ remarks that *J. kassaiensis* on further investigation will probably be incriminated as an intermediate host.

Charles Halcro

LI, Y. SCHIN, Y. C. Cecocolic Intussusception in a Case of Schistosomiasis Japonicum. *Chinese Med. J.* 14, Oct. 5, 1943, No. 1 (Continued from Vol. 1, No. 1), 2, 5th fig.

The author describes a chronic ceco-colic intussusception associated with the presence of eggs of *Schistosoma japonicum* in a female opium smoker aged 37 who died in Shanghai in 1930. No detailed clinical history could be obtained. At autopsy the patient was found to be extremely emaciated. From the anus protruded a rounded mass 5 cm long and 4 cm in diameter with purplish folds. The proximal part of the colon from the caecum to the distal transverse colon could not be seen. Part of the ileum was invaginated into the descending colon about the region of the splenic flexure. The adjacent ileum was dilated and oedematous and the colon enlarged and distended. The appendix had been passively drawn into the intussusception but was not itself invaginated. Ragged undermined brownish ulcers were present on the mucosa of the intussusception and the mucous surface of the intussusception was dark reddish with similar ulcers.

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6. *Iapage*

SZIDAT L. Was ist *Cercaria ocellata* La Vallette? Morphologische und entwicklungsgeschichtliche Untersuchungen ueber den Erreger der europäischen Cercarien Dermatitis des Menschen [What is *Cercaria ocellata*? Morphological and Developmental Researches on the Cause of European Cercarial Dermatitis of Man] *Deut Trop Ztschr* 1942 Oct 1 & 17 v 46 Nos 19 & 20 481-97 509-24 19 figs [36 refs]

The author gives in some detail the history of work on species of cercariae which can penetrate the human skin and cause dermatitis although their adult stages are not parasitic in man e.g. *Cercaria eliae*, *C. douthitti*, *C. physellae*, *C. stagnicolae*, *C. tuckerensis*. The adult stage of only one of these species (*C. douthitti*) is known. It is *Schistosomium douthitti* in rats and mice. The unnamed cercaria of *Schistosomium pathologicum* is a sixth American species which may possibly cause dermatitis.

Cercarial dermatitis of bathers similar to that known in the United States occurs in Europe especially in Germany. OGEL showed that it is due to the penetration of the skin by the cercaria named *C. ocellata* by LA VALETTE Sr. GEORGE in 1855. Szidat summarizes subsequent work on this species and describes his own work on it in East Prussia. He concludes that *Cercaria ocellata* of La Valette includes several species of schistosome cercariae. The structure excretory systems and biological behaviour of these are very similar.

In *Limnaea palustris* and *L. orata* Szidat found in addition to cercariae of *Bilharzia polonica* three new cercariae of the *ocellata* type. These were *Cercaria neocellata* n sp in *L. palustris*, the relation of this species to *Trichobilharzia foissacensis* is discussed. *C. parocellata* n sp in *L. orata* and *C. pseudocellata* n sp in *L. palustris*. These three new species were best distinguished by Brumpt's method of killing by heat. Each is described and a table shows the diagnostic details of each. They differ from *C. ocellata* La Valette in that they do not attach themselves to the substratum by their ventral suckers but remain suspended in the water. Apart from *S. haematobium* in Portugal and Greece and *S. bovis* in Sicily and Sardinia 11 species of *Bilharzia* are at present known in mid Europe most of them occurring in birds so that at least 11 different cercariae are to be expected but probably there are many others as well. Several schistosome cercariae from *Limnaea stagnalis* and *Planorbis septemgyratus* are of the same size as *C. neocellata* but it is uncertain whether these belong to closely

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J. F. Corson

DUKES A. Une epidémie de bilharziose intestinale à Lemfu (Congo Belge) en 1923. An Epidemic of Intestinal Bilharzia at Lemfu Belgian Congo in 1923. *Ann So Bel de Méd Trop* 1942 Dec 31 v 22 No 4 253-6

The author recalls an outbreak in children attached to a mission. The eggs of *Schistosoma mansoni* were found in the stools of most of the patients and it is noted that the symptoms closely resembled those of dysentery, the faeces containing blood and mucus. In a pool in which the children frequently bathed were found snails closely resembling *Planorbis lineatus* and tentatively named *P. kisumuensis* by DUPUIS.

In discussion SCHWETZ remarks that *P. salinarum* on further investigation will probably be incriminated as an intermediate host.

Charles H. Stocks

LI Y. & CHIEN Y. C. Cecocolic Intussusception in a Case of Schistosomiasis Japonicum. *Chinese Med J* 1942 Oct v 61 No 1 (Chengtu Edition 1 No 1) 25-8 2 fig.

The authors describe a chronic caeco-colic intussusception associated with the presence of eggs of *Schistosoma japonicum* in a female opium smoker aged 37 who died in Shan hai in 1930. No detailed clinical history could be obtained. At autopsy the patient was found to be extremely emaciated. From the anus protruded a rounded mass 5 cm. long and 4 cm. in diameter with spiral folds. The proximal part of the colon from the caecum to the distal transverse colon could not be seen. Part of the ileum was invaginated into the descending colon about the region of the splenic flexure. The adjacent ileum was dilated and oedematous and the colon enlarged and distended. The appendix had been passively drawn into the intussusception but was not itself invaginated. Ragged undermined brownish ulcers were present on the mucosa of the intussusception and the mucous surface of the intussusception was dark reddish with similar ulcers.

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related species of *Bilharzia* or whether the cercariae can use other snails as well as their chief intermediate host which is *L. palustris*. Szidat discusses his conception of parallel development between parasite and host pointing out that cercariae of *Bilharzia* species decrease in size with the increase in organization of their vertebrate hosts and at the same time the number of the terminal ciliated cells of their excretory system decreases.

Further spread of cercarial dermatitis in the open bathing places of bathing is to be expected as the urbanization of wild aquatic birds such as duck, gulls, swans and diver increases. G. Lapa

PRIOR A P. A Case of Cerebral Cysticercosis. *Jl Roy Army Med Corps* 1943 May 1 50 No 5 275-80 1 h

The patient was an East African native admitted to a military hospital with pneumonia. Within a few hours he passed into a condition of status epilepticus but there was no previous history of epilepsy. He died in 24 hours. At post mortem cysticerci were found in the cerebrum but not elsewhere in the body. There was no evidence of disintegration, calcification or of cellular response in the surrounding cerebral tissue. The cysts were healthy and symbiotic.

The author points out that the case was unusual in that it required the presence of an acute infective condition to bring to light the cerebral symptom and in that symptoms were caused by symbiotic cysts. He surmises that under the stimulus of the acute systemic disease the cysts imbibed fluid thus becoming tense and causing symptom. As a rule the parasite becomes dangerous only when disintegration and calcification set in and when cellular changes occur in the cerebral substance. Charles Wilcocks

BERNARD S E & ENCHINAS E. Cisticercosis cerebral con sintomatologia de tumor con localizacion a predominio ponto-cerebelosa. Cerebral Cysticercosis with Symptoms of a Ponto-Cerebellar Tumour. *Rev de Neuro-Psiquiatria* 1943 Mar 1 6 No 1 1-5 49 h 14 ref 1 French summary

This is a detailed account of the morbid anatomy of parts of the brain involved in an infection with *Cysticercus cellulosae*.

The patient a native of Peru had had symptoms suggestive of the presence of an intracranial tumour for over two and a half years before his admission to the hospital at Lima Peru. There were few signs pointing to a diagnosis of cysticercus infection but it was suspected from the indications of widespread lesion. A differential cell count of the blood showed 5 per cent of eosinophile leucocyte.

The first symptoms were tinnitus and increasing deafness. These were followed (in order of their appearance) by signs of lesions of the 1st 5th 3rd 4th 11th 9th and 12th cranial nerves, of lesions of the cerebellum pyramidal tracts and finally signs of bulbar compression shortly before death.

Post mortem examination showed many small cysts in the ponto-cerebellar area on both sides and in other parts of the brain. There was marked pachymeningitis and a peculiar kind of neuroglial reaction forming a sort of meshwork around the blood vessels. The substance of the brain showed much inflammatory and degenerative change. These lesions are described in detail and illustrated by many photomicrographs.

No cysts were found in any other parts of the body. See also
 DIXON & SMITHERS this *Bulletin* 1936 \ 33 102

J F Corson

RAO S S The Result of Amputation of a Limb for Filarial Lymphangitis and Elephantiasis *Indian Med Ga* 1943 Feb \ 78
 No 2 79 1 fig

The author of this short note states that in India the after histories of patients who have undergone amputation of a limb for elephantiasis have not been reported. He describes the condition of a man aged 34 whose leg was amputated because of elephantiasis and recurring lymphangitis in 1932. He remained free from lymphangitis until 1936 when the remaining leg was affected for the first time and since when the attacks have recurred and elephantiasis has developed. The amputation stump is also affected. The amputation therefore has not conferred any benefit beyond relieving the patient of the weight of the elephantoid tissue.

ROTH H The Role of the Intestinal Phase of Trichina Infection in the Establishment of Immunity to Reinfection *Amer J Hyg* 1943 July \ 38 No 1 99-111
 Charles Wilcocks

In an earlier paper [this *Bulletin* 1940 \ 37 660], the author showed that a single experimental infection with a relatively small number of larvae of *Trichinella* confers on guinea-pigs a long persisting high grade immunity to reinfection and that this is primarily due to a defence mechanism in the intestine directed against the number and longevity of adult worms coming from the second experimental infection. Was this immunity due solely to the permanent presence in the muscles of larvae derived from the first experimental infection (resistance to superinfection) or to the brief acute stage of the initial infection (a true acquired immunity) during which there were adult *Trichinellae* in the intestine for several weeks or larvae were migrating to the blood and settling in the muscles? To decide this question it was necessary to isolate a single phase of the infection: either the intestinal infection or the infection of the blood or muscles. To do this the author utilized the sexual differentiation of the larvae pointed out by BIGGE (*Arch f. uiss Tierheilk* 1934 \ 68 24-32). It was possible to infect guinea-pigs with either male or female larvae so that adult *Trichinellae* were obtained in the intestine which were either male or female. No copulation could therefore occur so that there could not be any larval migration or infection of the blood or muscles. ANDERSON and LEONARD (*J Parasitol* 1940 \ 26 Suppl 42-43) infected rats with either male or female *Trichinellae* by duodenal transplantation of adult worms from other rats and obtained a high grade immunity. Roth obtained larvae by artificial digestion and the male and female larvae were isolated by microscopical examination. A tedious and laborious process. Of all the larvae examined only 35-40 per cent were male. The general plan was to infect male guinea-pigs only with either male or female larvae and some five to nine weeks later to examine their muscles by biopsy for larvae. Larvae were found in the muscles of some of these guinea-pigs so that the isolation of male and female larvae was not always successful so that some guinea-pigs received both male and female larvae. These were discarded. To the

others in whose muscles biopsy failed to reveal larvae doses of both male and female larvae were given some 6-17 weeks after the initial infection with either male or female larvae. The number of larvae in seven test muscles of the guineapig (the masseters diaphragm upper parts of the foreleg and shanks of the hind legs) was then estimated.

The author claims that the results indicate that a single purely intestinal infection with *Trichinellae* of one sex only (i.e. without larval migration to the blood or muscle) will confer a more or less marked immunity to normal reinfection with larvae of both sexes given 6-17 weeks later. The muscles of 10 guineapigs given 100-300 male or female larvae and then given 500-600 mixed male and female larvae contained from 0.1 to 86 per cent of the average number of larvae in the muscles of control. When 25 guineapigs were given 160-400 male or female larvae and then doses of 1 000-2 000 larvae of both sexes (which killed all the control within 8 weeks) 11 of these 25 (44 per cent) survived for eight weeks and their muscle infection was only a fraction of what might have been expected. The sex of the larvae initially given did not matter: the immunity was produced by either male or female larvae. The time between the initial dose and the test dose could be varied from 1-4 months without appreciable difference in the immunity conferred. But the number of the larvae and their vitality which was affected by the time elapsing between the beginning of the artificial digestion by which they were obtained and the time when they were fed to the guineapig was of some importance. Even a few larvae (4 male and 5 female i.e. the normal sex ratio) given together often protect guineapigs better against the lethal effect of 1 000 larvae than 200 male or 320-400 female larvae. When either male or female larvae are given separately they persist in the intestine as long as 18 weeks just as *Trichinellae* do in normal infections. Roth thinks that the immunity conferred by the intestinal phase of *Trichinella* alone is a true acquired immunity and that it will be much greater when larvae are present in the blood and muscles.

G. Lapeere

ROSE, H. M. On the Occurrence of Forssman Antigen in *Trichinella spiralis*. *J Immunology* 1943 July 3 47 No 1 53-7 [13 ref.]

In seventeen cases of trichinosis the titers of agglutinins and hemolysin for sheep erythrocytes were found to be within normal limits. Similar findings were obtained in two rabbits infected with *Trichinella spiralis*.

Rabbit immunized against sheep erythrocytes and guineapig kidney did not develop precipitins for trichinella antigen.

The evidence available at present does not warrant the conclusion that *Trichinella spiralis* contains the Forssman antigen.

DEFICIENCY DISEASES

RAMAN T K Teleroentgenography of the Heart in Beriberi *J Indian Med Ass* 1943 Aug v 12 No 11 309-12 1 diagram & 8 figs

1 Teleroentgenography of the heart in beriberi was studied in 15 cases from 28 plates

2 The heart was enlarged in 14 (93.33 per cent) of the cases

3 The enlargement was observed in all the chambers in the following order (a) right ventricle (b) right auricle (c) left ventricle and (d) left auricle

4 Treatment either by vitamin B₁ or by liberal diet reduced the size of the heart in 10 of the 11 cases. The actual reduction in size could not be observed in the remaining 4 cases since a single picture only was taken

5 Five cases showed prominent pulmonary conus and reduction in the size of the conus was observed in 3 cases after treatment

6 Two cases showed prominent superior vena cava and the shadow disappeared in both the cases after treatment

7 One case showed congestion of the lungs as a result of heart failure

TSATSALOS D Der Brenztraubensäuregehalt des menschlichen Blutes bei Pellagra [The Pyruvic Acid Content of Human Blood in Pellagra] *Klin Woch* 1943 June 26 v 22 No 26/27 442-4 [15 refs]

The author discusses the chemical reactions between cozymase and the blood sugars. For estimating the pyruvic acid content he used the method of Clift and Cook which essentially consists in estimating iodometrically the bisulphate combined with the pyruvic acid after its liberation by the action of sodium bicarbonate. Union of the bisulphate with other carbonyl substances is destroyed by heating the solution for an hour with dilute alkali. The details of the process are thus given —

Three cc of whole blood are pipetted into 12 cc of 10 per cent trichloroacetic acid. This is then filtered and to 5 cc of the filtrate are added 3 cc of N/NaOH with one drop of 1 per cent alcoholic solution of thymolphthalein and the mixture heated in a water bath for an hour. After this is cooled N/H₂SO₄ is added to bring the pH to 2. One cc of the bisulphite solution is added and the mixture left to stand for 15 minutes. The free bisulphite is removed by decinormal iodine solution the liquid becoming a pale blue. Excess is got rid of by centinormal thiosulphate (the blue colour disappearing). N/100 iodine is added till the colour returns which disappears again by addition of 5 cc bicarbonate solution and the final product is titrated with N/100 iodine. 1 cc of which corresponds to 0.44 mgm of the pyruvic acid.

A table is given of 20 estimations of the blood sugar in gm per litre and the pyruvic acid in mgm per 100 cc of blood in healthy subjects in pellagrins and in those with other diseases. This shows that the normal is under 0.4 mgm per cent whereas in pellagrins it is increased to 1-1.6 mgm. (In beriberi it is nearly double this 2.7 mgm and is ascribed to the reduction of co-carboxylase in states of vitamin B₁ deficiency.) The increase is due to incomplete decomposition or dismutation of the pyruvic acid in the body. *H Harold Scott*

- GATG EP P & FERRY W La pellagre chez les mangeurs de manioc au Congo Français. [Pellagra in Manioc Eaters in the French Congo] *Rev Sci Me Plam et de l'Afrique Française Libre* Brazzaville 1943 Jan 1 2 No 1 18-23
- NICOL R. Observation d'un cas de pellagre [A Case of Pellagra.] *It J* 29-41 6th s 15 refs

In the first article are set out the case records of four native patients in Brazzaville in the second one of these cases is dealt with in greater detail. A diagnosis of pellagra was made the symptoms being similar in all cases. It is therefore only necessary to consider the more detailed description of the single case seen in the fifth annual relapse. Each attack was identical with the previous one and described precisely as an eruption bulliforme indurée et tomatite précédée by high fever. The bullous eruption appeared first on the hands and feet both surfaces and then spread to limbs and body including the mouth, scrotum and penis. The bullae healed leaving pigmented macules with depigmented centres and upon the latter the bullae of the next attack appeared. The lips, tongue and mouth were also involved. There was some conjunctivitis and lachrymation and in one case papillitis but no peripheral neuritis. The author lays stress upon the fact that these patients were manioc eater. Mixed vitamin and yeast were given as treatment.

If these lesions were merely limited anyone unfamiliar with pellagra might think he recognized that disease but if the accounts are read critically and the photographs viewed carefully it would probably be agreed that the disease described is not pellagra but a type of pemphigus of recurring type or a bullous type of erythema multiforme. They may seem what resemble hives aestivale. The reviewer remember seeing similar cases years ago in Central Africa and they do not in reality resemble pellagra. The patients in Brazzaville were almost certainly suffering from dietary deficiencies and if these were rectified doubtless restoration to health would be hastened but this does not prove any causal relationship between the disease and the deficiencies. The reviewer has written at some length lest these cases be accepted as pellagra and also with the hope that the several authors will be able to deal further with the interesting affection they have recorded.]

H S Stann is

- CLARKE A G & PRESCOTT F Studies in Vitamin B Deficiency with special reference to Mental and Oral Manifestations. *Brit Med J* 1943 Oct 23 403-5 6 figs on 1 pl. [16 refs.]

These studies relate to some 17 cases of vitamin B complex deficiency in patients treated primarily for nervous disorders. This represents 2% of the patients seen by us in the out patient department of the West End Hospital for Nervous Diseases. Originally they were mostly classified as suffering from functional nervous disorder and with one exception were women.

Notes of seven cases are reproduced, which will serve to draw attention to a type of deficiency disease which may easily pass unrecognised. The diagnosis depended on the history of malnutrition and response to treatment.

A list of symptoms common to vitamin B complex deficiency and psychoneurosis is given but diarrhoea, sweating, backache, phobias

and anxieties are stated to occur in the latter but not in the former [There is some error here as of course these symptoms are common in pellagra]

[Reference is made to published cases since 1934 but no mention is made of the summary of all cases published in Great Britain up to that date which appeared in the *Quarterly Jl Med* N S v 3 223 Another point needs comment—in speaking of oral lesions the authors appear to be unable to differentiate between the affection of the lips associated with riboflavin deficiency and conditions produced by poorly fitting dentures lipstick chewing gum etc Without wishing to appear dogmatic the reviewer believes that with care it should be possible to make a differential diagnosis The presence or absence of corneal vascularization is not mentioned]

H S Stannus

MITRA K Oro Genital Syndrome in Avitaminosis Effect of Treatment with B₂ (Complex) Vitamins *Indian Med Ga* 1943 July v 78 No 7 330-36 [26 refs]

After a very incomplete reference to the history of the group of symptoms which the author rather unfortunately refers to as the oro genital syndrome the results of treatment of small groups of boys and adults in two residential institutions in Patna province are recorded The symptoms were those well known and commonly associated with riboflavin deficiency with the exception that no patient complained of his eyes Dimness of vision is however not specifically mentioned and no slit lamp examinations of the cornea were made The angular stomatitis glossitis and scrotal dermatitis responded to riboflavin given either by oral or parenteral route Nicotinic acid was of no value nor had shark oil any effect

H S Stannus

TISDALL F F McCREARY J F & PEARCE H The Effect of Riboflavin on Corneal Vascularization and Symptoms of Eye Fatigue in R C A F Personnel *Canadian Med Ass J* 1943 July v 49 No 1 5-13 9 figs

In this interesting communication the authors give their experiences in an attempt to arrive at the causation of symptoms of eye fatigue in members of the Royal Canadian Air Force and to assess its relation to corneal vascularization due to riboflavin deficiency To give their conclusions first the incidence of vascularization of the cornea among apparently healthy young adults in Canada is surprisingly high and seems to vary inversely with the amount of riboflavin containing food in the diet (milk) Riboflavin in large doses over a period of two months decreased the vascularization of the cornea and the symptoms of eye fatigue in a large percentage of men exposed to glare while flying Early examination of the men revealed that various stages of corneal vascularization occurred Whereas the optimal daily intake of riboflavin is placed at 2.5 to 3.0 mgm the R C A F rations before June 1st 1942 averaged 1.6 mgm only It was further considered that since riboflavin is destroyed by light more would be necessary for those individuals exposed to much bright light

The authors point out the difference of opinion held by different observers in regard to the normal vascular supply to the limbus but they believe that congestion of this area is abnormal They have divided

their cases into normal—showing no proliferation of the vessels of the limbic plexus and no penetration of the cornea by vessels abnormal—*stage 1* an eye showing proliferation of the vessel of the limbic plexus but no penetration of the cornea or penetration only by twig in one or two sharply localized areas *stage 2* the same but penetration of the cornea by twigs and streamers *stage 3* as in 2 but with the added formation of loop Of 198 men engaged in flying and exposed to glare over water 0.5 per cent were placed in the normal group 8.6 per cent in (1) 43.9 per cent in (2) and 46.9 per cent in (3) Of the same 3 men 67 per cent on specific enquiry complained of two or more of the following symptoms—tiredness of the eyes, achy watery sandy sensations, headaches, reading intolerance, decreased visual acuity—worse after flights in bright weather. Seventy men were divided into three groups To group A 33 mgm riboflavin were given thrice daily for two months to group B the same for one month to group C a placebo. Symptoms were checked and photographic records made of the cornea at intervals of two weeks a specially devised camera (of which a short account is given) was used for the recording. Of the 28 men in group A 20 (71.4 per cent) showed either marked improvement or obvious by glance at the photograph or moderate improvement which was apparent when comparison of photographs was made and a study vessel for vessel carried out. Twenty of 21 who had had symptoms no longer complained. Of 21 men in group B 6 (28.6 per cent) showed the same result. Of 11 men who received the placebo none showed any improvement. Of the whole two months' Had progress was slow and continued over the whole two months. Had the trial terminated in two weeks few of the subjects would have shown any obvious change.

WISEMAN R H Confusion between Scurvy and Tropical Myositis with reference to an Outbreak of Scurvy among Prisoners East African Med J 1943 Aug 120 No 8 263-77 2 charts [18 refs]

The author gives an account of a condition which he saw among civilian prisoners at Karol Kenya characterized by pain and swelling in a leg and consequent difficulty in walking. The part affected commonly the calf was brown and hot and tender and the skin red and shiny. No pus or other fluid was obtained on incision. A composite picture of the ten cases dealt with presented—

- Painful tenderness muscular swelling in the part mainly the calf muscles and popliteal spaces but also muscles of the thigh and in one case the neck muscles
- Swelling in the regions of the ankle joints
- Ape osteonod in one case
- Gingivitis and pyorrhoea
- Anaemia gradual in onset and progressive in character
- Gradual loss of appetite and loss of weight

But none of the patients showed all these symptoms only three had oedema of the ankles only two gingivitis or pyorrhoea. Investigation of the diets of those affected revealed a marked lack of vitamin C and the giving of lemons was followed by rapid improvement. The author labels the condition definitely as scurvy it is perhaps a small point but would it not be wiser to diagnose it as an outbreak associated with hypovitaminosis C since hardly any of the classical

symptoms were present? The author refers to GLITSMAN'S paper (see this *Bulletin* 1942 v 39 893) where the reviewer pointed out the little likelihood of confusing tropical pyomyositis with the Bornholm disease. The present abstracter repeats that such confusion ought not to arise. Bornholm disease has for synonyms epidemic myalgia, epidemic myositis (if swelling of muscle occurs), epidemic pleurisy or pleurodynia and the pain is in the trunk muscles, most often the thorax and there is fever, sweating, shallow respiration, a lull after 24 hours or so and in many cases a return of the pain in another 24-48 hours and recovery in four or five days—totally unlike tropical pyomyositis or the cases recorded here.]

H. Harold Scott

VENOMS AND ANTIVENENS

SERGEANT E. Symptômes graves d'envenimement scorpionique succédant à une amélioration trompeuse. [Recurrence of Grave Symptoms in Scorpion Poisoning after Treatment with Specific Serum.] *Arch Inst Pasteur d'Algérie* 1942 Dec v 20 No 4 357-8

The severe symptoms of scorpion poisoning usually disappear rapidly after treatment with specific serum and after a few hours there is no longer any danger. In 17 out of 221 cases, however, which have occurred during the past seven years and been recorded from time to time in previous numbers of these *Archives* [see this *Bulletin* 1943 v 40 485-486] death occurred in spite of serum treatment. Grave symptoms suddenly reappeared after a period of amelioration following an injection of specific serum and death followed even in some cases when a further injection of serum was given.

The author gives short notes of these cases. In nine of them he thinks that life could have been saved if the patients had remained under observation and serum been given as soon as grave symptoms reappeared. He concludes that patients should be kept under observation for several hours after the first injection of serum even if they are apparently recovering.

J. F. Corson

SERGEANT Et. Sur un scorpion du sud marocain (*Hottentota gentili* Pity) [A Scorpion of Southern Morocco *H. gentili*] *Arch Inst Pasteur d'Algérie* 1943 June v 21 No 2 83-8 4 figs (1 map) & 4 pls

DERMATOLOGY AND FUNGUS DISEASES

IRIARTE D R El carate en Venezuela [Pinta in Venezuela] *Rev Med Trop y Parasit Habana* 1942 Nov-Dec 18 No 6 75-81 1943 Jan-Feb 19 No 1 1-7 12 figs (1 map)

An excellent account of carate el pinto (it has several other synonyms) the details being given under 11 headings. Abstract cannot do it justice and the whole article deserves translation *verbatim*. Here we can do little more than indicate the contents adding a few remarks on some of the points. The author starts with a brief relation of the history of the disease its origin and geographical distribution. It seems to have been known in America before the discovery of the continent in 1492 and the name carate (or carare) appears to be of Caribbean origin. There is no evidence of the African slaves introducing it. Its distribution in Venezuela is variable and in some Mexican States it is very common in Guerrero 23-6 per cent of a population of just over half a million in Mexico State 34-6 per cent of 937,633 population of nearly two and a half million in Los Estados 27-0 per cent. In the municipalities of Pedraza and Quebrada Seca it is more particularly concerned the State of Barinas shows 11 per cent. In the municipalities of Pedraza and Quebrada Seca it is more than 50 per cent and the average for the whole State is 10 per cent. Twelve of the 20 States and two Federal Territories into which Venezuela is divided are affected.

The second chapter deals with the aetiology. From 1898 to 1927 it was believed to be mycotic and various moulds were isolated among these were *Aspergillus* *Fusarium* and other species. *Cephalosporium prochaetia* and *Penicillium* has been shown to be the cause and the moulds to be mere concomitants. Chapter III is concerned with transmission the insect vector being thought to be *Sylliphaea*. Next the prevalence and the symptomatology are detailed. Venezuelan figures covering a large number of cases give 638 in children up to 10 years 471 from 10-20 years 53 from 20-30 years 61 from 30-40 years 19 between 40 and 50 and 11 over 50 years. Among 251 cases in Barinas State Venezuela the author gives the following: Under one year 1 case 2-5 years 12 6-9 years 37 10-14 years 53 15-25 years 74 26-40 years 67 41-69 years 40 and one case in each of the next two decades. As regards sex he gives 118 males and 13 females. In Colombia MEYER found 69 per cent giving a serum reactions = 291. He next speaks of the blood picture and the positive W.F. the Commission in Mexico found 1-3 positive among 130 two were anticomplementary and only three were negative. Chapter VI considers the coexistence of cardio-vascular lesions and Chapter VII the histopathology of carate. The differential diagnosis from chloasma pityriasis versicolor keratosis mucronalis palmaris syphilis nerve leprosy Addison's disease and lastly (and chiefly) vitiligo. Points of distinction between white pinta and vitiligo are given in a table which the author calls them consider the last sections of the chapters as the author calls them) consider brief prognosis relapse reinfection and immunity prophylaxis and treatment. Reinfection may undoubtedly occur. Prognosis in the old days when the cause was believed to be mycotic was regarded as

much more favourable—at all events was more cheering to the patient than it is now that the cause is known to be a spirochete in that infection does not confer immunity. The treatment recommended is by arsenicals (as neosalvarsin) to begin with and bismuth to follow up. The author appends a list of the names and ages of his 281 patient and the districts from which they came.

White Pinta	Vitiligo
Areas affected nearly always hypochromic. Achromic over areas exposed to pressure as knuckles, knees, ankle, elbows	Areas affected usually completely achromic
Lesions dry, usually scaly and desquamating	Skin appears normal, no v. or d. or desquamation
Rarely affects the genitalia, scalp or flexures	Often on these sites. The hair of head and genitalia often white
Patient almost certainly comes from one of the endemic zones	May come from anywhere
Serological reactions Wassermann or Kahn positive in practically all cases	If these reactions are positive they are due to concomitant syphilis and not to the vitiligo
Arsenic and bismuth will cure lesions except the achromic spots which do not clear up	Generally incurable. Mercury, bismuth, arsenic are quit with out effect

H Harold S II

COVANT N F & HOWELL A The Similarity of the Fungi causing South American Blastomycosis (Paracoccidioides Granuloma) and North American Blastomycosis (Gilchrist's Disease) *J Invest Dermat* 1942 v 6 353-70 4 pls [Summary taken from *Rev Applied Mycol* 1943 Sept v 22 Pt 9 309-10]

The writer describes and discusses his comparative studies on eight cultures obtained from cases of South American blastomycosis or paracoccidioides granuloma (three of which were referred to *Paracoccidioides brasiliensis* and two to *P. coccidioides*) and seven of the North American form of the disease (*Blastomyces dermatitidis*) isolated from patients at the Duke Hospital, Durham, North Carolina. The media used were Sabouraud's dextrose, beef infusion, beef extract, blood and glycerine agars and two series of tests were run, one at room temperature and the other at 37°C. All the strains were tested for pathogenicity by intraperitoneal injections on white mice with 1 cc of a 1:200 suspension (by volume) of the yeast like form produced in one week old cultures on blood agar at 37°C. All the strains exhibited at one time or another the three cultural types assigned to this fungus viz. mealy, prickly and filamentous. In the early stages of growth

E.

the hyphae intermingled with the single or budding round thick walled elements 7 to 18 μ in diameter were broken up into arthrospores 4 to 6 by 2 to 2.5 μ but as development proceeded the growing end narrowed to 1.5 to 2 μ in diameter septa appeared at intervals of 10 to 15 μ and numerous raquette cells intercalary chlamydospores and atypical hyphal swellings were observed in the submatrical mycelium by the time the *Oidium* like appearance of the colonies had disappeared. The production of aerial mycelium was accompanied by the formation of sessile round to oval conidia 3 to 4 μ in diameter and of a round to pyriform type 4 to 5 μ in diameter borne on lateral sterigmata of varying length. Round to pyriform chlamydospores 7.5 to 18 μ in diameter with thick sometimes wavy peculiarly sculptured walls reminiscent of *Sclerotium* developed in profusion in old cultures.

On transference to the incubator the cottony aerial growth of the room temperature cultures became either smooth and waxy or cerebriform and wrinkled. The yeast like budding forms of the fungus were accompanied by short thick walled square ended cells of the *Oidium* type occurring singly or in chains of three or four. The process of conversion from the filamentous to the yeast like type of growth was followed microscopically in van Tieghem cell cultures inoculated with the mycelial form and incubated at 37°.

B. brasiliensis (the name applied to the various South American strains) was characterized in the early stages of growth at room temperature by cerebriform colonies which subsequently became covered with a short aerial filamentous white to light brown growth. Many round to pyriform thick walled budding forms 3 to 2.5 μ in diameter were present at first and the mycelium was composed of thick walled cells 4 to 7 by 2 to 3 μ which readily dissociated into arthrospores. In older cultures numerous intercalary and terminal chlamydospores and atypical hyphal swellings were produced by the submatrical mycelium while round to pyriform sessile conidia 3 to 4 μ in diameter developed on the short aerial mycelium.

At 37° five of the South American strains consisted mainly of round multiple budding cells with a few short moniform chains of two to five cells while in the other two strains the relative proportions were reversed the buds produced on the surface of the large thick walled cell were round to oval 1 to 1.5 μ in diameter or bacilliform.

The differences observed in the cultural development and clinical behaviour of the North and South American blastomycoses are considered to be of specific rather than of generic importance. *B. dermatitidis* is retained (pending the general acceptance of a more appropriate name) for the agent of the North American disease and the various designations proposed for the South American granuloma related to synonymy with *B. brasiliensis*.

MOORE M. COOPER ZOLA K. & WEISS R. S. Chromomycosis (Chromomycosis). Report of Two Cases. *J. Amer. Med. Ass.* 1943 Aug 28 v. 127 No. 18 1237-43 8 figs. [Refs in footnotes]

Two cases of chromomycosis are here reported. In the first the lesion was of five years duration and affected the left wrist consisting of a plaque only 2.5 cm in diameter. The second patient showed a small lesion of the helix of his right ear of two months duration only. This latter lesion was diagnosed as carcinomatous and was therefore excised.

by means of the crutery. For this reason the causative lesion could not be isolated but subsequent microscopical examination revealed many fungus cells dispersed throughout an intense cellular exudate. It was proved that the wrist verrucous and granulomatous growth was caused by *Phialophora verrucosa* this being the sixth proven case to be reported in continental United States. The cases are described in full detail as are the organism and the microscopical observations.

Sydney Thomson

DOBES W L. Moniliasis of the External Ear Canal. *Southern Med J* 1943 Sept v 36 No 9 614-16 2 figs [15 refs]

The yeast like fungi most frequently encountered are the (1) *Monilia* (2) *Cryptococci* and (3) *Mycodermas*. The *Monilia* are subdivided into several strains of which *Monilia albicans* is considered pathogenic and *Monilia candida*, *Monilia parapsilosis*, *Monilia krusei* and other strains are considered saprophytic. In 1922 Greenbaum and Klauder reported 35 strains of yeast like organisms and concluded that yeasts are found normally on the skin and may under certain conditions become pathogenic and cause superficial infection. Benham and Hopkins cultured the skin of 100 normal individuals and among the yeast like fungi those most frequently encountered were the *cryptococci* and *mycoderma*. A few non pathogenic species of *monilia* were encountered but *Monilia albicans* was never found. From these recent works the term moniliasis has been restricted to a definite group of dermatose in which the species *Monilia albicans* can be found.

ASHFORD's work on sprue is then reviewed and reference is made to cases in which various organs have apparently been directly involved. Among the diseases broncho-pulmonary infection, osteomyelitis, meningitis, vaginitis and stomatitis are mentioned. It is stated that intertrigo which has well defined bright red exuding patches with scalloped borders is recognized as a dermatosis from which *Monilia albicans* can usually be cultured. Few cases of invasion of the external auditory meatus have been reported. In the instance recorded here the patient was a white woman aged 36 years. There were greasy scaly patches of seborrhoeic eczema over the back of the neck and ears whilst the area over the mastoid region showed an acute oozing eczema. The canal of the left ear showed a dark mould like growth moist and involving most of the circumference of the canal. At the distal end was a whitish patch of wet blotting paper like appearance about 0.5 cm in diameter obstructing the view of the tympanic membrane. The right ear showed a similar but small patch of foul material. On the floor of this meatus was a moist purulent material covering an inflamed and oedematous base. Cultures from this gave growths of *Monilia albicans* whilst those from the mould like growths showed *Aspergillus fumigatus*. The lesions all healed after daily ten minute soaking with a 2 per cent solution of gentian violet.

Culture tubes of Sabouraud's medium (Weidman's modification) in which the hydrogen ion concentration is from four to four and eight tenths will retard the growth of bacteria and allow a luxuriant growth of fungus at room temperature. The growth in most cases can be observed in two to five days.

Sydney Thomson

GONZÁLEZ OCHOA A & DE LOS ANGELES SANDOVAL W Estudio sobre cinco especies del género *Candida* Berkhout 1923 causando lesiones humanas (Study of Five Species of the Genus *Candida* Berkhout 1923 causing Lesions in Man) *Rev Inst Salubridad y Epidemiol Trop Mexico* 1943 June 14 No 2 149-61 6 pl English summary

The members of this genus *Candida* have usually been regarded as harmless or at most as capable of causing lesions of little significance though TULLIP and MISHAUBLIT [below] have recorded generalized moniliasis of skin and mucosae and WIKLER *et al* [below] a mycotic involvement of the endocardium and brain. The authors have studied certain species isolated from lesions in man—onychia folliculitis from the putum of patients with cough and fever or bronchitis from occasionally with haemoptysis but in which the tubercle bacillus could not be found from squamous erythema of axilla and chest and a superficial ulcer of the thumb.

The following species were isolated from the lesion: *C. albicans*, *C. parakru*, *C. defomans* and *C. guillermondii*. Cultivation was obtained on Sabouraud glucose (2 per cent) and in Raulin's fluid medium. The authors describe their morphological character, their fermentation reactions and what they call auxanograms a biological term which they do not attempt to define. [No experimental work is referred to such as might tend to show that these mould were of aetiological significance and not merely concomitants or accidental contaminants].

TULLIP A L & MISHAUBLIT E Generalized Moniliasis with Proved Pathogenicity Report of a Case *Amer J Hyg* 1941 Vol 34 No 5 643-50 4 figs H Harold Scott

WIKLER I WILLIAMS E G DOLGLASS E D & E MOORE C W Mycotic Endocarditis Report of a Case With Histologic Report by R C DILLON *J Amer Med Ass* 1941 May 23 119 No 4 333-6

PERVIS P A BENSON Miriam E & HOLINGER P H Laryngeal and Systemic Histoplasmosis (Darwin) *Ann Intern Med* 1943 18 No 3 84-93 3 figs Summary taken from *Ped Applied Med* 1943 Sept 1 2 Pt 9 301-8

The clinical course and post mortem observations in a case of laryngeal and systemic histoplasmosis (*Histoplasma capsulatum*) in a 63 year-old Latvian male a preliminary account of which has already appeared in *Brit Med J* 1942 1 39 109 are fully described. Tissue and exudates removed from the larynx five months before death were cultured on various media at 37°C and at room temperature growth being entirely obtainable in three to five days and persisting predominantly in the mycelial form through numerous subcultures. The organism developed on many kinds of decaying material both in sunlight and darkness the latter condition as well as humidity being conducive to growth. *H. capsulatum* succumb to one hour autoclaving at 15 lb pressure or half an hour's freezing but was very refractory in dextrose broth culture to common acids alkalis and sulphanilamide derivatives though showing no resistance to thymol potassium permananganate or tartar emetic.

Yeast forms of the fungus 2 to 4 μ in diameter were recovered from four out of 15 white mice injected intraperitoneally with 2 to 3 cc of a heavy suspension of the mycelial stage to which they reverted on subculture. Large yeast cells similar to those described by Moore were recovered from one of the mice but on subculturing changed into smaller yeast forms and eventually into the mycelial phase. Cultures from the spleen and liver of mice inoculated with the large yeasts gave rise to the mycelial stage with typical chlamydospores.

TOMB J W The Treatment of Tinea (Dhobie's Itch) *J Trop Med & Hyg* 1943 Feb-Mar v 46 No 1 6

Tomb quotes a case in which a patch of tinea circinata had persisted over the sub sternal notch for 20 years in spite of treatment with many preparations. It was finally cleared by two applications at an interval of 10 days of Zephurin Concentrate (10 per cent) (Bayer). This is described as an aqueous solution of a mixture of alkyl dimethyl benzyl ammonium chlorides. It is practically non irritating to healthy skin but causes itching, burning and the formation of bullae in diseased areas which desquamate in three or four days.

Charles Wilcocks

LANDOR J V Dermatitis Venenata caused by Smoke *Brit J Dermat & Syph* 1943 Jan v 57 No 1 17-19

The author has only been able to find two references in the literature to dermatitis being caused by smoke. Both of these refer to the burning of branches of the Mango Tree (*Mangifera indica* Anacardiaceae) but neither account gives details of actual case. During August 1940 thirteen patients men women and children were seen in Singapore. Each case showed the typical acute vesicles chiefly affecting the exposed parts of the body. All the cases had arisen in one coolie line of the brickworks. Investigations proved that firewood from the

Banjai tree had been used in the kitchen. This wood was later identified as the bark of *Mangifera caesia*. Experiments with the steam distillate from this wood reproduced the typical vesicular lesions within 24 hours.

Sydney Thomson

MISCELLANEOUS

TRANS ROY SOC TROP MED & HYG 1943 Sept v 37 No 2 71-88
Discussion on Modern Drugs in the Prevention and Treatment of Tropical Diseases [JAMES S P SCOTT H H HAWKING F HANSCHALL H M HOWIE J W NICOL W D & SHUTE P G BIGGAM A G ADAMS A R D]

Col S P JAMES in opening the discussion recalled the researches on malaria in cases of general paralysis made by YORKE and MACFIE at Liverpool in 1924 [this *Bulletin* 1925 v 22 50] these were followed by work at the Ministry of Health Malaria Therapy Centre at Horton Hospital Epsom [this *Bulletin* 1931 v 28 566 & 973 1932 v 29 693 1933 v 30 73 & 76] done by the speaker and his colleagues. He next referred to the recommendations of the Malaria Commission

of the League of Nations [this Bulletin 1933 v 30 837] and went on to reveal of experimental work on avian malaria and the theory of the existence of an exo-erythrocytic cycle of the human malaria parasite in the cells of the reticulo-endothelial system in man this Bulletin 1937 v 34 282 1938 v 31 225. He approved of beginning the treatment of human malaria with at least one shock producing dose of an antimalarial drug.

Dr Frank HAWKIN referred to the chemotherapeutic studies of LORKE and his co-workers on trypanosomes particularly the use of a technique which enabled the action of drugs to be studied *in vitro* this Bulletin 1930 v 27 237 and went on to discuss the action of sulphenamides in various infections. He emphasized the need for estimating the concentration of drug in the blood and advocated the use of large initial doses of such drugs as germanin (Bayer 205) and mepacrin (atebrin).

Dr H. M. HAN-CHELL spoke of his experience with propamide in the treatment of chancroid ulcer lymphogranuloma inguinale and infection with *Trichomonas vaginalis*.

Major J. W. HOWIE related some observations made with Tanret reagent on the urine of persons who had taken quinine. 53 fit men took 5 grains of quinine daily and all showed positive Tanret reactions in one or more specimens of urine but in only 20 cases did the positive result appear within one hour after taking quinine and many were again negative within 12 hours. The test was used in 100 patients with acute malaria who were receiving 30 grains of quinine daily in 88 patients a positive reaction was obtained in every specimen of urine while in 12 of the remaining 12 patients the reaction was uniformly negative and was irregular in the others. The negative patients were given quinine by intramuscular injection and the reaction became positive and remained positive when the quinine was continued by mouth. Such a test is valuable and easily carried out.

Dr W. D. NIOL suggested that the suppressive use of quinine might produce neurosis and thought that all antimalarial drugs should be withheld from a man on his arrival in the United Kingdom and until a relapse occurred. He described an experiment made on 4 persons two of whom took atabrin 0.1 gm daily on 6 days each week (total 0.6 gm per week) and the other pair took 0.2 gm on Saturday and Sunday only (0.4 gm per week). This was continued for three weeks and then allowed to rest for a week for three weeks by mosquitoes heavily infected with a Rumanian strain of *Plasmodium falciparum*. After this atabrin was continued as before one pair taking it for four weeks and the other pair for eight weeks. No infection resulted but 10 controls became infected within the normal incubation period. He included that the protozoites were destroyed soon after their injection by the mosquitoes.

Major (Hon.) A. G. BIRCHALL suggested that work on the blood concentration of atabrin may show that large initial doses should be given.

Dr A. R. D. MANN said that in Liverpool they found that 30 grains of quinine a day by mouth for three successive days invariably arrested the clinical attack later they treated about 1,000 cases of malaria monthly acquired in West Africa. They rarely gave quinine by the parenteral route. Recently they had been using mepacrine (atebrin) to forestall relapses.

Col JAMES replied

KING P 7 Epidemic Prevention and Control in China *Chinese Med J* Washington 1943 Jun-Mar v 61 No 1 47-54

This article gives interesting information first of epidemic diseases occurring in China and second of the organized control body which is to be a headquarters nation wide epidemiological intelligence service and to coordinate all civil and military anti epidemic activities. Among epidemic diseases plague and cholera have long taken a foremost place in China. A sinister and new development in epidemiology is the finding that the Japanese as part of their totalitarian methods have adopted the barbaric procedure of bacterial warfare. Dr R Pollitzer epidemiologist of the National Health Administration and other senior members consider that evidence strongly suggests that the Changteh plague was caused by enemy action and that plague infected fleas were most probably embedded in scattered gun and rags. Other diseases than plague and cholera which are important causes of morbidity and mortality are malaria dysentery typhus relapsing fever diphtheria and smallpox.

The organized epidemiological service which established an office for emergency epidemic control in 1940 has its intelligence service its anti epidemic corps quarantine services venereal disease treatment stations bathing delousing and anti scabies stations provincial and anti epidemic units. These are certain to be highly important organizations in the post war medical restoration in China. *H F Harvey*

MUMFORD E P & MOHR J L Background to Post-War Reconstruction Part I Preliminary Report on Parasitic and other Infectious Diseases of the Japanese Mandated Islands and Guam *Am J Trop Med* 1943 July v 23 No 4 381-400 1 map 82 refs]

The Japanese mandated islands are situated between the equator and lat 20 N and between long 130 and 170 E they include the Palau Marianas Caroline and Marshall groups. The American island of Guam is among the Marianas Is.

The authors discuss the prevalence of the more common parasitic and infectious diseases which have been reported from these islands and remark that only 4 (yaws dengue filariasis and climatic bubo) of the 66 diseases mentioned are restricted to warm countries. [Climatic bubo or lymphogranuloma inguinale occurs also in Europe and America and probably other parts with a temperate climate.] The most prevalent and important diseases appear to be yaws gonorrhoea tuberculosis conjunctivitis ankylostomiasis and scabies. Tuberculosis has been reported to be the leading single cause of death on Guam. *Ascaris lumbricoides* is said to infect over 90 per cent of the inhabitants and is thought to be associated with a disease somewhat like asthma and called *Guha*. Filariasis is reported but seems not to be prevalent undulant fever malaria and plague have also been reported but so far they do not appear to have become established.

J F Corson

TRINIDAD AND TOBAGO Report of the Agricultural Policy Committee of Trinidad and Tobago (Part I) (Second Printing) 142 pp 1943 Govt Printer [50c]

This report contains remarks on nutrition and health and sanitation in the section on policy which are of interest to Colonial medical men.

Charles H ilcocks

January 1944

Tropical Diseases B [January 1944]
LILLIE R D A Giemsa Stain of Quite Constant Composition and
Performance made in the Laboratory from Eosin and Methylene
Blue Pib H alt/ Rep Wash 1943 Var 12 : 58 No 11
449-32
The author discusses the variations which
Giemsa stain a a result of variations
tuent dyes It is noted
sum the oxidative

The author discusses the variations which are liable to occur in Giemsa stain as a result of variations in the composition of the constituent dyes. It is noted that the character of the product resulting from the oxidation of methylene blue with a definite proportion of potassium bichromate is fairly constant and it is proposed that the use of a crude azures be substituted for the usual constituents of Giemsa stain. In the paper full details of the method of preparation are given.

LILLIE R D Blood and Malaria Parasite Stains
Methylene Blue Methods
No 6 948-71
C M Henson

LILLIE R D Blood and Malaria Parasite Staining with Eosin Azure
Methylene Blue Methods *Amer J Pub Health* 1943 Aug; 33
No 6 948-51

Many American preparations of Giemsa's stain were found to be unsatisfactory for staining thick blood films. The ingredients were examined spectroscopically and various mixtures tested and a satisfactory Giemsa stain now on the market. Considerable variations in result were also found when commercial samples of Wright's Romanowsky stain were tested. The differences were apparently connected with the method of polychroming. Spectroscopic examination and tests of solution of various stains and composition showed that Wright's stain should have initial absorption maxima between 600 and 660 m μ (written as 660 μ or 6600 μ) or 6600 μ .

J R Corson

PERUSA AND IRAQ FORCE DIRECTOR OF MEDICAL SERVICES MEDICAL
MEMORANDUM NO 4 OF 1943 34 pp 6 folding figs Effects of
Heat in Persia and Iraq Republished with amendments June 1943
J F Corson

somewhat shorter version of this publication appears in the
 The memorandum is of the greatest value it should be closely
 studied by all medical officers in charge of troops in hot climates. The
 mark made that during the hot weather of 1943 nearly three
 quarters of the cases of general effects of heat among troops in Persia
 and Iraq occurred before dawn and after disembarkation. Many of
 them could have been prevented had adequate precaution been taken
 on board ship. In the aetiology of condition due to heat the exo-
 genous factor of high atmospheric humidity (with a wet bulb tem-
 perature of 31.2, the danger point) rapid dehydration deficient
 intake of fluid or salt and lack of rest are mentioned. The endogenous
 factors include non acclimatization alcoholism fevers and diarrhoea
 illnesses associated with high fever or vomiting are especially
 danerous. It will be remembered that BUTLER (Bull. of Med.
 1943, 1, 3, 623) reported that in Libya all the patients sent to
 hospital with a diagnosis of heat stroke were found to be suffering from
 malaria sandfly fever or septicaemia.
 Microscopic examination in fatal cases of heat hyperpyrexia shows
 great venous engorgement of all organs with haemorrhagic pulmonary
 oedema and multiple haemorrhages sometimes in the brain. The
 cause of death is usually circulatory failure.

Clinical differentiation of various types of the effects of heat is not always easy the types are not clear cut and one may progress to another. The classification given in this memorandum is as follows —

Heat exhaustion common and not usually serious. It is in fact a fainting fit with normal temperature but is often associated with heat cramps [see below]

Subacute effects of heat — These are important the onset is insidious and there is an almost apyrexial period of increasing derangement of the body chemistry with a final phase of high fever. The condition begins with lassitude and headache going on to nausea and vomiting, giddiness and insomnia. Frequency of micturition and either constipation or diarrhoea may occur. The mentality of the patient may change to dulness or irritability. Signs of dehydration begin to appear and the amount of chloride in the urine is usually below normal.

This stage usually lasts for 7-10 days but may be longer unless checked it may progress to hyperpyrexia.

Acute heat stroke — In this form the failure of the heat regulating mechanism is sudden and an apparently healthy man may be attacked so quickly that he is already unconscious when found. Usually there is delirium com or convulsions the skin is dry the temperature may reach 112 F the face is congested and the muscles rigid. The cerebrospinal fluid is normal in appearance and its pressure is only rarely raised. Nevertheless it would seem wise to perform lumbar puncture this would reveal cases of meningitis and if the fluid is clear but under pressure may be a useful therapeutic measure (see CORR this Bulletin 1942 v 39 721). A warning is given that over rapid removal of cerebrospinal fluid may lead to the formation of a dangerous pressure cone which may compress the medulla in the foramen magnum.

Heat cramps are seen characteristically in ship stokers. They are caused by deficiency of sodium chloride due to excessive sweating.

Treatment of the severe states must be instituted at the earliest possible moment a delay of a few hours may mean the death of the patient. The essentials are a cool atmosphere rest replacement of fluids and salt and reduction of body temperature either by immersion of the process of evaporation of sweat or by immersion in a cold (but not too cold) bath. Cooling measures must be stopped when the temperature has fallen to 102 (from 106) or 104 (from 109) to avoid dangerous collapse. Antipyretic drugs are dangerous.

Fluid must be given in large quantities—as 0.25 per cent saline drinks if the patient can swallow or as intravenous normal saline. The fluid and salt requirements should be regulated by the appearances of dehydration the blood concentration (estimated by red cell count or percentage of haemoglobin) the amount of urine the amount of chloride in the urine (usually low) and the blood pressure (usually low). Intravenous saline is indicated if the systolic blood pressure is below 100 mm.

A balance sheet of fluid intake and output should be kept and fluid should be given in large quantities until the total output balances the total intake. In this balance sheet at least 8 pints must be allowed for the daily loss of fluid by sweating of a man at rest in a moderately cool room in hot weather. Intravenous administration of fluid however calls for the greatest care the cardiovascular system may not be able to deal with it. Signs of this are failure of the blood

covers the *Anophelines* more fully than the *Culicines* (because so many *Culicines* are not likely to be carriers of disease and are therefore omitted). This is followed by accounts of the several species their external characters (male, female and larva), distribution and relation to disease. The treatment of biology is adequate. Maps show the distribution in Australia of the species of *Anopheles* and of *Aedes aegypti* (which is found in all towns except in the extreme south and the remote centre). The map dealing with *Anopheles* also indicates the distribution of endemic malaria which is shown as limited to two small areas in North Queensland and three inland in the Northern Territories. It is not shown from any part of Western Australia in which respect the author seems to differ from CILENTO [*Tropical Diseases in Australasia*, 2nd Ed. 1942, p. 2—see this *Bulletin* 1943, v. 40, p. 69].

One might wish that the author's point of view had been more definitely Australian and that he had given an account of malaria in the western Pacific in place of a page of excerpt on malaria in Britain. We feel also that he has borrowed too freely, though always with acknowledgment from classical writers (CHRISTOPHERS and EDWARDS) and that the extracts are not always quite appropriate. For instance it gives a feeling of lack of continuity to read details about the biology of *Aedes aegypti* in Northern Nigeria or *Campala* (several pages being quoted from EDWARDS 1941 *Mosquitoes of the Ethiopian Region*). It is facts from Australia and that part of the world that the reader wants.

It is much to be hoped that Australian entomologists will give detailed attention to *Anopheles punctulatus* and its variety *moluccensis* which should be critically studied with due regard to male terminalia, pharynx, larval chaetotaxy and so forth. If the variety differs only in certain detail of pattern then the malarialogist may treat it as *punctulatus* but if there are other structural differences or biological differences then large questions of the relation of *moluccensis* to malaria demand study.

P. A. Buxton

The news has been received with great regret of the death on December 19th 1943 of Sir ARTHUR HORR, who had been a keen and helpful member of the Honorary Managing Committee of the Bureau since his appointment in 1924.

TROPICAL DISEASES
BULLETIN

Vol 41

1944

[No 2]

SUMMARY OF RECENT ABSTRACTS *
II YELLOW FEVER*General*

SOPER (p 536) gives a concise and lucid account of yellow fever in the Americas during the years 1938 to 1942. Briefly the points are as follows:—(1) Epidemics transmitted by *Aedes aegypti* and originating from other outbreaks transmitted by the same mosquito have not been observed since 1934. (2) Only one outbreak transmitted by *Aedes aegypti* but originating from jungle yellow fever has been discovered (3) Jungle yellow fever has occurred in Brazil, Bolivia, Peru, Colombia and Venezuela. (4) In some forested regions it is apparently possible for jungle yellow fever to be maintained permanently on a mosquito animal mosquito basis [that is man is not a necessary factor]. (5) The Yellow Fever Service of Brazil aims at the complete eradication of *Aedes aegypti* from the country and this has already been achieved in seven States. [This is a large conception. Species eradication was the aim of the authorities in the recent campaign against *Anopheles gambiae* in Brazil and the yellow fever organization played a great part in carrying out successfully what appeared to be a most ambitious programme. The results already achieved against *Aedes aegypti* give a hope of success in an even wider field. How far the principle of species eradication can be applied in other branches of tropical hygiene remains to be seen but it is a stimulating aim which should not lightly be dismissed as impracticable.] (6) The vaccination programme has been satisfactory with the exception of the events which are recorded below in this Summary. Recommendations made are that anti-larval campaigns should be organized on a permanent basis that the viscerotomy and vaccination services be extended to all regions of jungle yellow fever and the latter to all aircraft services.

Epidemiology

SMITH and HOWIE (p 303) examined the sera of 100 natives of Ibadan, Nigeria and found that 11 gave fully and 9 partially positive mouse protection tests. These persons were aged 7½ to 11½ years.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 v 40. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

The results may be compared with the 42 per cent positive found by Beeuikes and Mahaffy in the same place in children up to 14 in 1934. In some of the positive children there was a history suggesting an attack of yellow fever. In the present series four mice were used for each test and survival of three or four was considered as evidence of complete protection. In the earlier series six mice were used and survival of five or six was regarded as evidence of protection.

CECCALDI (p. 907) reports that during 1941 the diagnosis of yellow fever was made from examination of post mortem specimens in six persons from Gabon and the French Cameroons.

CORADA REDONDO (p. 603) reports six cases of what is claimed to be yellow fever in Europeans in Kogo Spanish Guinea. Of 25 sera from persons of this area eight were found to give positive mouse protection tests (but in the absence of details of the persons concerned the significance of this result cannot be assessed).

The grey monkey (*Cercopithecus aethiops centralis*) is one of the most ubiquitous mammals in the East African yellow fever zone and is migratory. HUGHES (p. 771) has shown that in certain individuals of this species circulating yellow fever virus may be found in high concentration after injection of the virus or after transmission by the bite of infected *Aedes* mosquitoes but that there is marked variation in susceptibility and in virus titre. It seems probable that this animal may be implicated in the spread of yellow fever to man.

[It has been pointed out that in the Summary of Recent Abstracts on Yellow Fever (this Bulletin: 1943 v. 40: 97) an incorrect reading of Findlay's view of the maintenance of rural yellow fever in West Africa has been given. Findlay (1941) stated that although *at present* the only two definite factors known to be concerned in spread are the infected mosquito and the infected human being, before it is possible to give an answer to the question whether animals (bats, squirrels and other small rodents) play any rôle in maintaining endemic yellow fever it will be necessary to examine some hundreds of specimens instead of at the time he wrote just under 50.]

The comment on Findlay's paper therefore does not apply and there is no antithesis between his views and those of the Rockefeller workers.

LAUMERT (p. 694) has failed to find evidence that the yellow fever virus can multiply when injected into certain South American poikilothermal animals: the animals included iguanas, lizards, tortoises, boas, toads and frogs.

During the last epidemic of yellow fever in Mexico which occurred in 1919-23 the incidence in certain areas was sporadic and BUSTAMANTE (p. 388) was therefore led to think it probable that the jungle form existed in these places. Sera collected in the valley of the Rio Uumacinta, Yucatan, were sent for examination by the mouse protection test. This area appeared to offer favourable conditions for the occurrence of jungle yellow fever but no protective bodies were found in persons under 29 years of age and BUSTAMANTE *et al.* (p. 453) consider that these results indicate that yellow fever has not been present for many years. The last clinical case reported in Mexico was in 1923.

Transmission

LEWIS (p. 602) considers that *Aedes aegypti* was probably of little importance in the transmission of yellow fever during the epidemic of

1940 in the Nubia mountains of the Sudan except in certain villages. He gives a list of seven species of mosquitoes known to be potential vectors and found in the area. Of these *Aedes vittatus* is probably very important. *Aedes taylori* important. *Aedes luteocephalus*, *Aedes metallicus* and *Aedes aegypti* of some importance in the hills or in certain villages and *Aedes simpsoni* var *luteus* and *Taeniorhynchus africanus* of little or no importance. *Aedes furcifer* although not a proved potential vector is regarded as probably an important transmitter. *Aedes simpsoni* is a natural vector of yellow fever in Uganda. GIBBINS (p 304) reports that its principal breeding places are in the axils of various water holding plants—a variety of plantain an Aroid (*Colocasia*) and the pineapple. Breeding also takes place occasionally in tree holes. The mosquito never enters buildings. It bites by day and is common in native gardens.

HARRIS (p 39) has found that the commonest species found breeding in domestic water containers in Dar es Salaam Tanganyika Territory is *Aedes aegypti*. It also breeds in tree holes but here *Aedes simpsoni* and *Aedes metallicus* are more frequently found than in domestic water. ANDRZEJ (p 537) has investigated the geographical distribution of species of *Haemagogus* in Venezuela.

DUNNAROO (p 905) discussing insect control in aircraft notes that disinestation stations have been established in Trinidad Venezuela and Colombia and inspection stations in Porto Rico Haiti and Jamaica to cover all air routes from South America to the United States and that Pan American Airways require all aircraft to be disinfested between all ports. He describes the method of using 2 per cent pyrethrin preparations projected from a sprayer.

Aetiology

VAN DEN BERGHE (p 40) reports the sudden production by the neurotropic French strain of yellow fever virus of symptoms characteristic of viscerotropic strains after intracerebral inoculation into a baboon. Subcutaneous injection of liver emulsion from this baboon into rhesus monkeys reproduced the viscerotropic type of disease but intracerebral inoculation of brain material into mice gave results similar to those produced by neurotropic strains. This course of events is regarded as possible in man after inoculation of Laigret's vaccine. The author does not look on it as a true mutation but rather as a demonstration of the fact that the virus is pantropic and that after repeated brain passages the neurotropic elements have become predominant. The preponderance of neurotropic or viscerotropic particles is apparently influenced by the tissue environment brain and liver respectively.

[For a sudden change towards neurotropism in the attenuated strain 17 D see FOX *et al* below.]
FOX (p 772) has found that animals which have survived cerebral infection with yellow fever virus are very much more resistant to highly neurotropic strains than animals immunized against ordinary systemic infection and that this difference is not related to the levels of protective antibodies in the sera. There is however a possibly significant relation between resistance to neural infection and the antibody content of the brain. It seems that there is a local specific mechanism based at least in part on the concentration of antibody in the cerebral tissue.

FOX (p 772) has shown that in mice inoculated intracerebrally with the attenuated virus 17 D there may occur specific but non fatal infections with immunity against reinfection by the same route. Small initial doses produce more of these non fatal infections than higher doses and different strains of 17 D differ greatly in their effect. The French neurotropic strain and the pantropic Asibi strain produce this effect only occasionally but strains isolated from patients with jungle yellow fever in Brazil produced these non fatal infections with some frequency. It is therefore evident that with these jungle strains the demonstration of these non fatal infections is essential in measuring the infectivity of virus preparations.

PENNA and BITTENCOURT (p 848) have identified virus in the brain of three monkeys which died of generalized tuberculosis 63, 93 and 159 days after intracerebral inoculation with virus 17 D. No such persistence of the virus was found in seen others similarly inoculated and subsequently killed. It is suggested that the tuberculous process may have had some effect in unmasking a latent virus.

Vaccination

HARGETT *et al* (p 692) describe in detail the method adopted by the United States Public Health Service of preparing yellow fever vaccine from strain 17 D without the use of human serum. Fertile hen's eggs are inoculated with 17 D virus of 227th-230th passage. Egg passage virus rather than virus propagated in tissue culture is preferred. After incubation the embryo is triturated in water and centrifuged. The supernatant liquid is tested for sterility and virus content and is frozen if the test are satisfactory. It is dried and kept at temperatures of -16 to -30 C. For use the vaccine is rehydrated and diluted with saline and is injected within one hour of rehydration. Certain requirements must be complied with:—Sterility must be absolute. Guinea pigs inoculated intraperitoneally must not show illness. There must be at least 66 000 minimum lethal mouse doses per millilitre. A monkey inoculated intracerebrally must show no circulatory virus and must have mouse protection test (having previously been negative) and must recover without developing paralysis from any illness incurred.

FOX and CARRAL (p 451) have examined the sera of 976 persons at various intervals after vaccination each with one of four sub strains of the attenuated virus 17 D. Three of the sub-strains had been passaged 220-250 times in tissue culture (these are referred to as low passage) the other (referred to as high passage) had been passaged 315-385 times when used for preparation of vaccine. It was a condition of the test that serum taken soon after vaccination should have been kept in sealed ampoules until the later examinations and it was shown that serum kept in this way suffered over a period of nine months no significant deterioration in antibody content compared with the same serum kept in desiccated form. It is known that desiccation is effective in maintaining a high antibody titre over a considerable period. In the tests mice aged 17 to 21 days were used since it was known that young mice are much more susceptible to intraperitoneal dose of neurotropic yellow fever virus than are old mice [see THELLER and BUCHER, *WHITMAN*, below].

The results showed that in vaccinated adults who were non immune before vaccination the immune state produced persists satisfactorily for at least four years from the point of view of the group.

individuals. But the high sub strain of virus had lost some of its antigenicity and the results obtained with vaccine prepared from it were not so satisfactory. Moreover low immune levels both early and late were the rule in subjects under 10 years of age at the time of vaccination. Age therefore seems to be important in determining the immune response and the duration of immunity after vaccination.

In some sera in which no antibodies could be detected by routine tests a more sensitive technique revealed their presence but the evidence suggests that immunity induced by the 17 D virus may completely disappear in at least some cases.

Fox *et al* (p 44) report the occurrence of signs of encephalitis in persons vaccinated against yellow fever with preparations of the attenuated virus 17 D. This complication appeared somewhat suddenly in 1941 and in the most heavily affected area was found in 0.5 per cent of 55 073 persons vaccinated. Mild reactions usually evident six to eight days after vaccination had previously not been uncommon but the severe reactions now reported with encephalitis developing 10 to 21 days after vaccination appear to be new for this vaccine. The vaccine itself was responsible and the evidence pointed to a sudden alteration in the character of the virus in a small number of subcultures away from the parent strain. The authors have now changed their technique so that all vaccine is now initiated from primary and secondary batches of known character and adequate size.

In the *Journal of the American Medical Association* (p 40) there is an account of the outbreak of jaundice in American troops inoculated with yellow fever vaccine. It is evident that this like other similar outbreaks is not a form of infection with the yellow fever virus and the assumption is that the human serum used at that time in the preparation of the vaccine was the agent responsible for the jaundice whether because it contained a virus or by some other process is not here determined. Since this outbreak the human serum component has been left out of the vaccine and it is believed that the risk of jaundice has been eliminated.

Fox *et al* (p 41) give a full account of outbreaks of jaundice which have occurred in the large groups of people inoculated in South America with yellow fever vaccine prepared with human serum. They have now eliminated the serum and since that was done no case has been found in 164 000 persons inoculated. The authors have not been able to transmit the infection to animals and it is not yet clear if the disease is due to a virus or to some other process connected with the serum but most of the evidence indicates that the serum contained the exciting agent. Certain batches of serum only were incriminated. It is evident that not all sera can produce the disease.

FINDLAY (p 389) notes that attempts to produce immunity to yellow fever by means of virus inactivated by heat ultra violet light or formaldehyde have not been successful. He has investigated the effect of 37 soaps fatty acids and other surface acting agents to see if they would inactivate the virus while permitting it to retain its antigenic properties. Many of the substances were capable of inactivating the virus and showed the desired effect of inactivation with retention of some degree of antigenicity. These were acetyl salicylic acid linoleic linolenic maleic and mucic acids and tetralene.

THEILER and BUGHER have each shown that baby mice are much more susceptible than adult mice to extraneural injection of yellow

fever virus WHITMAN (p 534) has used this fact to institute a more satisfactory mouse protection test. With mice aged 18-21 days the results of injection of 0.06 cc. of a mixture of two parts immune serum and one part virus suspension are equivalent to those of injection of 0.6 cc. into adult mice which have received intracerebral starch. The volume of serum can be increased and the amount of virus maintained constant and in this way very small amounts of antibody can be detected. The test will therefore be useful for the sera of animals and of man after vaccination in which antibody levels may be extremely low. A disadvantage is that only mice of uniform and exactly known age can be used and therefore only those laboratories in which breeding is carried out can carry out the test.

Charles Wilcocks

MALARIA

YAO Y. T. Present Status of Malaria in Free China. *Chinese Med J* Washington 1943 Jan-Mar v 61 No 1 38-46

Numerous epidemics of malaria in China have occurred since the outbreak of the Sino Japanese war. In the autumn of 1938 an epidemic of *P. vivax* malaria occurred in Chenchow Honan among refugees following the breaching of the bank of the Yellow River to stop the Japanese advance. The disease was mild in type. At the same time some 60 per cent of Chinese soldiers fighting in the east of Hupeh contracted malaria. In the same year subtertian malaria much hampered the construction of the Yungfu Lutsai section of the Hengyang Luichow Railway. In 1939 thousands of workmen on the Lungling Wanting section of the Yunnan Burma highway died of subtertian malaria. From 1938 to 1940 severe annual epidemics of malaria afflicted the districts on the Hunan Iweichow border. Banditry and rinderpest among the cattle impoverished the population and lowered its resistance. In Chungking malaria became epidemic in 1939 and each autumn has seen a recurrent epidemic in the outskirts of that city. 85 per cent of cases are *P. vivax* infections.

In the flat low lying regions of China malaria is mild and predominantly *P. vivax* in type. In the south western provinces of Free China malaria is hyperendemic especially along the borders of Indochina, Thailand and Burma. Here *P. falciparum* infections predominate.

Twenty five species and six varieties of Anopheles have been reported from Free China. These are listed. The list includes 20 of the 21 species identified by SWEET *et al* [this Bulletin 1943 v 40 666] and also the following—*aikeni* var *benalensis*, *annularis* var *adisi*, *gigas* var *simlensis*, *jamesi*, *zeyporiensis*, *karuani*, *mayadi*, *pattoni*, *philippinensis*, *sacharovi* and *stephensi*. In south western China *A. minimus* is the chief vector of malaria. The number of dissections of this species in this part of China that have been reported in the literature is 2380. Infection rates have varied from 0 to 30 per cent, average 5.5. *A. zeyporiensis* var *candidiensis* comes second in importance as a vector. Infection rates of 8.0 and 0.2 per cent have been reported. *A. hyrcanus* var *sinensis* is found all over China from Manchuria to Hainan Island and from the east of Shanghai to the west of Szechuan. Infection rates varying from 0 to 7 per cent have been

reported average 0.3 Other species have been dissected in insufficient numbers to determine their importance as vectors. The present anti-malarial organizations in Free China are briefly described. See also FENG L C this *Bulletin* 1937 v 34 942 ROBERTSON *ibid* 1941 v 38 501 WILLIAMS *ibid* 1941 v 38 502] Norman White

YU N G & YANG Y Y Notes on Subtertian Malaria in Yunnan *Chinese Med J* Washington 1943 Jan-Mar v 61 No 1 17-30 [16 refs]

Subtertian malaria is severely endemic in Yunnan notably in the valleys of the Yuan Kiang Puri Kiang and Lin tzang Kiang. There has been a very large influx of people from all parts of China since the opening of the Yunnan Burma highway. This paper is based on a study of 107 cases hospitalized in Kunming. Only 13 of these patients were natives of Yunnan Province. All but two were males 91 being in the 20 to 39 age groups. There was a sudden rise in subtertian malaria incidence in June which reached its maximum in July and remained high in August and September. The incidence declined sharply in October. The authors analyse the symptoms and signs of the 107 cases and describe the laboratory findings. A great many of the protein manifestations of this disease were represented. There were 33 patients suffering from pernicious forms of the disease. 10 of these were hyperpyrexial nine bilious remittent and six comatose. Three of the comatose patients died as did one with the cardiac form. In obscure cases sternal puncture and the ephedrine provocative test were found useful.

Dix B K Malaria at Chandpur (Bengal) *Indian Med Ga* 1943 July v 78 No 7 327-30 1 chart

Chandpur is an important railway and steamer station in the Tipperah District East Bengal. It is the railway junction of lines going to Calcutta Chittagong and the Surma Valley Assam. The railway depot at some distance from the town contains a small labour colony (population not stated) where the author made a five day survey at the end of October 1942 to determine the causes of a severe outbreak of malaria. Chandpur is normally a healthy station with low malaria endemicity but in 1941 the monsoon rainfall was excessive and was productive of more persistent mosquito breeding than usual. This coincided with the arrival of large numbers of evacuees from Burma many of whom passed a night or two in Chandpur. Many of them had been suffering from fever. In July 1942 there was an abnormal prevalence of malaria sufferers from this disease attending the railway and labour camp dispensaries up to October were about twice as numerous as the average annual attendances of the two previous years. Random samples of blood were examined parasites were found in 22 out of 37 *P. falciparum* in 17 *P. vivax* in 4 both species in 1. Crescents were found in 13. Five species of Anophelids were found breeding in tanks and borrowpits. *A. aconitus* *A. annularis* *A. tagus* *A. pallidus* and *A. hyrcanus* adults of the first three were taken in houses. Two of 24 *A. aconitus* dissected were infected none of 66 *A. annularis* was infected. *A. philippinensis* an important vector in this part of Bengal was not found. Hitherto *A. aconitus* has not been considered a vector of importance in this part of India.

Norman White

WILSON D Bagster & NOTLEY F B Malaria in Southern Somalia (Italian Somaliland) *East African Med J* 1943 Aug 1 20 No 8 255-62 1 map

This is the first British report that has been published about malaria in what was Italian Somaliland. Italian reports on the subject were not numerous [this *Bulletin* 1939 1 36 678 1938 1 35 23 and 509 1937 1 34 374].

The northern part of the country between 5 and 12 N is semi desert with a few small ports little agriculture no permanent surface water and practically no malaria. The southern part between 1 S and 5 N contains the two main ports Kismayu and Mogadishu and two rivers Juba and Webbe Shebeli. Over the whole of the southern part there is a patchy distribution of malaria transmitted by *A. gambiae* which breeds either in irrigation water flood water from rivers rain water accumulations over large areas localized rainpans or in pools in permanent or seasonal rivers. The malaria transmission season is short almost everywhere and the disease mostly epidemic in type. The riverain areas have a Bantu population with large admixture of Somalis; they have considerable immunity to malaria but insufficient to prevent epidemic manifestations. Spleen rates observed were of three types: higher spleen rates in older than in younger age groups in places with a very brief or intermittent malaria season; a similar spleen rate at all ages with increasing enlargement with age in places with an annual epidemic of a few weeks duration; spleen rates the same or decreasing with age with spleens of similar size at all ages indicative of a considerable annual period of transmission which is epidemic at its peak. Examples of the last were found in the Bantu village of Barire and in the mixed Bantu and Somali population of Villaggio both places are on the Webbe Shebeli. *Norman White*

SCHWETZ J Recherches sur la limite altimétrique du paludisme dans le Congo Oriental et sur la cause de cette limite [Research on the Altitude Limit of Malaria in the Eastern Congo and the Causes of this Limit] *Ann Soc Bel e de Méd Trop* 1942 Sept 30 1 2 No 3 183-98

Malaria is prevalent throughout the African Continent with the exception of certain mountainous regions and of southern parts of South Africa. The author seeks to give greater precision to that statement to fix the limit of altitude above which endemic malaria does not occur in the eastern Congo and to determine the cause or causes of such limitation. Published reports regarding the absence of malaria at high altitudes in Kenya Uganda Eritrea and Abyssinia are analysed. The author began to study the question in 1933 when the examination of a number of communities between Lake Kivu and Haut Ituri showed that altitude played no part in the incidence of malaria up to 1400 metres; that rare cases of malaria infection observed at 1800 metres were more than probably contracted in neighbouring valleys and that there was no malaria at altitudes of 2000 metres. In 1939 many thousands of natives were examined living in numerous places at altitudes varying from 620 to 2200 metres between Lake Kivu and Lake Albert. On the high plateaux to the west and south west of Lake Kivu are four large communities separated by some 70 kilometres the one from the others—Nvangezi 1650 metres Walunou

1750 metres Kabare 1950 metres and Kadjedje 2150 metres. Blood examinations gave the following results Nyangezi 12 of 55 adults and 38 of 83 children infected Walungu 10 of 63 adults and 6 of 103 children infected Kabare 2 of 74 adults and 3 of 80 children infected Kadjedje no infection found in 30 adults and 56 children. There is a certain migration between the villages and it is almost certain that the few infections in Kabare and even in Walungu were contracted elsewhere. The low infection rates of children support this view. Thus the limit of endemic malaria in Equatorial Africa may be fixed at 1750 metres. *P. gambiae* is not found above that height. *A. christi* is not found below it with rare exceptions. The absence of malaria at high altitudes seems to be due to the absence of an effective vector rather than to the influence of cold impeding the development of the malarial parasite in the mosquito though this might be a factor of importance in certain places. Norman White

FIRST L C Malaria Mortality and Morbidity in the United States for the Year 1941. *J. National Malaria Soc.* Tallahassee Fla. 1943. 2 No 1 39-46 2 figs. [14 refs]

The steady decline in malarial mortality in the United States continued in 1941 during which year 1390 deaths were ascribed to this disease. Of these deaths 1113 (80 per cent) were reported from the 14 malarious Southern States which contain but 30 per cent of the total population. This figure represents a malarial mortality rate of 2.73 per 100,000 for the Southern States as compared with rates of 3.4, 4.5 and 5.8 for the previous three years. In all the Southern States except Oklahoma the 1941 malarial mortality rates were the lowest on record. The Oklahoma rate was only 2.2 per 100,000. The highest State malarial mortality rates were Arkansas 8.4, Mississippi 6.7, S. Carolina 6.6, Florida 4.4, Alabama 4.2 and Louisiana 3.0 per 100,000. All the figures in the report refer to the civil population only. The army figures of both morbidity and mortality are considerably lower. [For malarial mortality in 1940 see this Bulletin 1943 v 40 664.] Norman White

BEANETT A W Malaria Endemic in Iowa. Reprinted from *J. Iowa State Med Soc.* 1943 Aug 10 pp

ZOZAN C Paludismo y arrozales [Malaria and Rice Fields]. *Rev. Facul. de Méd. Bogotá* 1943 Feb v 11 No 8 448-76

LOZNER E L & NEWHOUSER L R Studies on the Transmissibility of Malaria by Plasma Transfusions. *Amer. J. Med. Sci.* 1943 Aug v 206 No 2 141-6 [15 refs]

These studies were designed to determine the likelihood of transmitting malaria by plasma transfusions a matter of topical interest and importance at the present time. The donors and the 35 recipients were all patients in a hospital. The donors were undergoing malaria therapy with either *P. malariae* or *P. falciparum*. The recipients were also patients with central nervous system disease in whom malaria therapy was either indicated or not contraindicated. From each donor 250 ml of blood were drawn into 35 ml of 2.5 per cent sodium

citrate The mixture was centrifuged the same day (2 500 r p m. for 1 hour) and stored overnight at 8 C On the following morning the plasma was aspirated without filtration In 20 instances the plasma was frozen immediately after aspiration and then stored at -20 C In 3 of the observations the plasma was dried from the frozen state In 12 cases plasma was preserved at room temperature (20-25 C) in the liquid state for 1-14 days before administration The dosage of plasma varied from 60 to 270 ml It was given intravenously by a standard set in which was incorporated a glass tape filter (equivalent to a 150 mesh stainless steel filter) for removal of fibrin shreds The only certain transmissions of malaria in the whole series were in the cases of two patients who received plasma preserved in the liquid state for only one day There was also a very doubtful case among the five patients who received plasma that had been kept in the liquid state for one week before injection None of the five administrations of plasma that had been kept two weeks in the liquid state transmitted malaria The likelihood of the transmission of malaria by any plasma programme regardless of type of preservation used is practically non-existent

Norman White

DAS GUPTA C R Transmission of Malaria through Transfusion of Blood *Indian Med Ga* 1943 Aug v 78 No 8 384-7

A patient suffering from myeloid leukaemia received a fourth transfusion of fresh citrated blood Five days later the patient developed high fever with a rigor Blood examination revealed a heavy infection with *P falciparum* The donor an apparently healthy male with no history of previous malaria had returned to Calcutta from a holiday just previous to being bled The day following the bleeding he had an attack of fever due to *P falciparum* He had evidently been in the incubation period of infection when bled The author suggests that when blood transfusions are given in circumstances in which it is impossible to eliminate the risk of malaria infection the adult patient so treated should be given five grains of quinine thrice daily for three days see also this *Bulletin* 1941 v 38 505

Norman White

BOYD M F & RUSSELL J C Preliminary Observations on the Inheritance of Susceptibility to Malaria Infection as a Character of *Anopheles quadrimaculatus* Say *Amer J Trop Med* 1943 July v 23 No 4 451-7 1 fig

If a batch of female *Anopheles quadrimaculatus* are fed on a man whose blood contains the infecting stage of *Plasmodium vivax* it is commonly observed that some mosquitoes do not become infected moreover the number of sporocysts developing in the infected individuals varies greatly There is evidence that infections of certain Culicines by avian malaria parasites is influenced by genetic factors The authors enquire whether this is the case with their *A quadrimaculatus* and *P vivax* and hope to obtain a strain of *Anopheles* which would be highly and also uniformly susceptible

The authors make brother sister matings in their laboratory strain having given the females a blood meal which is later shown to have infected some of them The technique of rearing is based on long experience Rearing of separate families and attempts to infect are

The report is lavishly illustrated with 24 microphotographs chiefly of oocysts and sporozoites but including illustrations of the eggs of the two subspecies and the larval structure of *A. osualdoi guarujaensis*. Two tables contain details of published reports concerning the experimental infection and the natural infection of species of *Anopheles* represented in the Brazilian fauna.

Norman White

VALCEL M & CAMPOURCY A. L'anophélisme au Cameroun Français [The *Anopheles* of the French Cameroons] *R- Sci Méd Pharm et Vét de l'Afrique Française Libre* Brazzaville 1943 Jan v 2 No 1 85-8

Anopheles aibiae is the commonest species along the coast in the forest zone and in the mountains in the latter it accounts for 90 per cent of the collection. In the savannah country however it is less prominent (30 per cent) and *A. phaoensis* is more in evidence. *A. funestus* occurs in all these zones as does *A. splendidus* except that in the mountains it is very rare. Ten other species are named but each does not represent more than about 1 per cent of the collections. Seasonal variations are slight.

Sporozoite indices are recorded — *A. gambiae* 14.3 (26.6 in the first part of 1942) *A. funestus* 7.4 *A. splendidus* 8. In several similar villages of varying gametocyte indices the sporozoite index of *A. gambiae* showed a relation to the gametocyte index. In one small village however where the gametocyte index was 7 the sporozoite index was 25.5 here the standard of living was relatively high.

The breeding places of *A. gambiae* are so many and so widespread that in the opinion of the authors no serious efforts at control can be made in rural areas. anti-larval measures have however been instituted at Douala and Yaoundé but measures against adults are left to individual initiative.

Charles H. H. H. H.

COGGESHALL L. T. Immunity in Malaria *Medicine* 1943 May v 22 No 2 87-102 2 figs [45 refs]

This lecture covers in a masterly manner the contributions made in recent years to our knowledge of immunity in malaria. Special attention is paid to those studies demonstrating the existence and behaviour of certain antibodies acquired during the development of immunity. The rôle of these antibodies is essential for the protection of the host. It is probable that the protective substances in the immune serum sensitize the parasite making it more vulnerable to phagocytosis. The behaviour of malarial antibodies is similar to that observed in the immunological reactions of any host in its attempt to defend itself against pathogenic organisms in general. The eradication of latent malaria in experimental animals by chemotherapy is followed by a complete loss of immunity after a brief interval. The eradication of an acute infection in its early stage leaves the host with no immunity whatever.

[An adequate summary of a lecture covering so wide a field is not possible. Nearly all the literature on which the author draws has been duly summarized in this Bulletin.]

Norman White

WITKEN G J Sternal Puncture in the Diagnosis of Malaria *Lancet*

1943 Oct 16 466-8

This paper is concerned with the value and limitations of sternal puncture as a diagnostic method in malaria. A stout lumbar puncture needle serves well for sternal puncture. A piece of glass or metal tubing with a rubber buffer at each end attached so as to allow only half an inch of free needle to protrude is a useful safety device. Local anaesthesia is used. The puncture is made in the middle of the sternum at the level of the second interspace. When the marrow is penetrated the resistance decreases appreciably. From 0.5 to 1 cc of marrow blood is aspirated. Films may be made directly and stained with a Romanowsky stain.

Sternal puncture was made in 95 cases in which serial thick blood drops taken at six hourly intervals had proved negative. Sixty of the 95 cases were found in 39 patients by this means. Sixty of the 95 cases were clinically atypical in 13 of these patients parasites were demonstrated by sternal puncture. The author describes the artefacts commonly seen in marrow films which may simulate plasmodia. The interpretation of stained preparations of sternal marrow fluid especially thick drops is not a responsibility to be undertaken lightly by the inexperienced. He concludes that sternal puncture which is easily performed is of value it elucidates the diagnosis in a number of cases of obscure illness. Malaria parasites and their metabolic disintegration products are more numerous in the sternal bone marrow than in the peripheral blood.

RUMBALL C A PARSONS SMITH B G & NAYCLAIRVILLE L Sternal Puncture in the Diagnosis of Malaria *Lancet* 1943 Oct 16 468-9

Of 294 unselected cases of malaria treated in hospital in the Middle East diagnosis by peripheral blood examination was made in 256 and by sternal puncture in 38. Peripheral blood examination failed to reveal parasites in any of these 38 patients. Sternal puncture enabled a heterogeneous group of apparently unrelated illnesses to receive appropriate diagnosis and treatment. It is of special value in latent malaria of the illustrative cases described. The discovery of *P. falciparum* by sternal puncture followed by appropriate treatment resulted in complete recovery. This method of diagnosis is accessory to peripheral blood examination. It does not replace it.

YU N G & YING I Y Comparative Merits of Peripheral Blood Smear, Ephedrine Provocative Test and Sternal Puncture in the Diagnosis of Malaria *Chinese Med J* Washington 1943 Jan - Mar 1: 61 No 1 31-7 [37 refs]

A hundred cases of malaria were studied. 67 subtertian and 33 tertian. Blood smears of all cases were examined. Sternal puncture was carried out in 90 cases and the ephedrine provocative test was used in 34. The provocative test consists of the hypodermic injection of 0.03 gm of ephedrine blood smears being made 15, 30 and 60 minutes

after the injection. The amount of aspirated fluid in sternal punctures never exceeded 0.2 cc. The percentage of positive findings with sternal puncture was 90, with the ephedrine provocative test 70.6, and with peripheral blood smears 54. Both sternal puncture and the ephedrine test are very helpful in the diagnosis of chronic cases of malaria. The relative value of the tests is discussed in relation to duration of illness, previous attacks of malaria, height of temperature, size of spleen, antimalarial drug that have been taken, and the type of infection.

Norman White

DAO L. Sobre un caso de hepato-esplenomegalia palúdica gigante provocando síndrome de compresión intestinal. [A Case of Malarial Splenomegaly causing Symptoms of Intestinal Obstruction.] *Bol. Hospitales Caracas* 1943 Jan-Apr, 42 Nos 1-2 26-34 3 figs.

An account is given of an uncommon complication in a case of benign tertian malaria of at least five years' duration in a man of 37 years of age. The spleen was greatly enlarged, extending to the pubes and right iliac region and the liver was palpable three fingers' breadth below the ribs. Associated with the condition were recurrent attacks of constipation and abdominal pain amounting to temporary obstruction which the author attributes to mechanical compression by the enlarged spleen. In making a differential diagnosis he was able to exclude ascites, schistosomiasis and Chagas's disease. Splenic puncture to exclude kala-azar was not done owing to the patient's condition.

Examination of the blood showed 1,797,000 erythrocytes, 1500 leucocytes (6 per cent eosinophiles) and 35 per cent haemoglobin. Hookworm eggs were found in the faeces.

He was treated with atabrin and plasmoquine followed by quinine and was also given liver extract, iron and iodine while his infection with hookworm was treated with tetrachlorethylene. Great improvement was observed after a few months.

J. F. Corson

J. AMER. MED. ASS. 1943 Sept 25, 123 No 4 205-8. The Drug Treatment of Malaria: Suppressive and Clinical

This is a circular letter from the Office of the Surgeon General of the U.S. Army. It is admirably clear and concise. An adequate summary is impossible but attention will be directed to a few points of importance. The efficacy of quinine, mepacrine (atabrine) and pamaquin (plasmoquine) is compared; the routine use of pamaquin is not advised. Mild disagreeable symptoms may attend the suppressive use of mepacrine; if they do they usually follow on onset of the first few doses and are more apt to occur if the drug be given between meals. Sodium bicarbonate or sweetened drinks given with the mepacrine may prevent such symptoms. Mepacrine in the usual suppressive dose does not affect the flight capacities of aviators but some have found the mild symptoms caused by suppressive quinine troublesome. The limitation of the supply of quinine makes its use for suppressive treatment prohibitive save in exceptional circumstances.

Suppressive treatment has its chief use among troops operating in malarious country where it is impossible to give them full protection from mosquitoes. Mepacrine should be used for this purpose. There

are advantages in starting suppressive treatment in advance of exposure. With the doses used the maximum concentration of the drug in the plasma is not attained until after the third week. Seasickness may contraindicate the administration of mepacrine before arrival in the malarious region. Suppressive treatment should not be stopped until the men have arrived at a base where adequate medical care is available. Clinical malaria is apt to follow cessation of suppressive treatment. Mepacrine for suppressive treatment should be given in doses of 0.1 gm at the evening meal six days a week (0.6 gm a week) or 0.05 gm once a day at the evening meal for six days and 0.1 gm on the seventh evening (0.4 gm a week). If quinine has to be used for suppressive treatment 10 grains a day should be given.

In the treatment of the clinical attack it is advised that 0.2 gm mepacrine and 1 gm sodium bicarbonate with 200 or 300 cc of water or sweetened tea or fruit juice be given every six hours for 5 doses followed by 0.1 gm thrice daily after meals for six days (2.8 gm in seven days). For quinine the doses are 15 grains thrice daily after meals for two days and then 10 grains thrice daily for five days (16 gm in seven days). If parenteral administration be indicated mepacrine dihydrochloride 0.2 gm in 5 cc sterile distilled water [with slight warming to dissolve it if necessary] should be injected into each buttock. One or two additional doses of 0.2 gm may be given intramuscularly if necessary at intervals of 6 to 8 hours. For intravenous administration of quinine 10 grains of the dihydrochloride in not less than 200 cc of sterile isotonic salt solution should be given slowly. Numerous other useful indications are given regarding the care of the patient, relapses, records, follow up and other matters. [It is an excellent circular.]

Norman H Hule

TALBOT D R. New Aspects of Malaria. *J Amer Med Ass* 1943
Sept 25 v 123 No 4 192-4

This paper relates the experience of a medical officer in charge of an outlying military base around which marshland and jungle precluded the possibility of effective antilarval measures. Malaria was hyperendemic in an adjacent native community the members of which had a 95 per cent malaria parasite infection rate. In the base were both military and naval personnel. The army group received atabrin as a suppressive 0.15 gm twice daily two days a week. The navy group received no prophylactic medication but treatment was given if symptoms arose or if malaria parasites were found in the blood. There was a high incidence of frank malaria in the navy personnel. In the army group the incidence was low but cases were much more severe and slower to respond to treatment. The only two cases of cerebral malaria were in the army group.

Later the procedure was changed. Monthly examinations of the blood of all members of the force were made. All army parasite carriers received intensive quinine treatment for four weeks (doses not stated). This kept almost all the group from having clinical malaria. Naval men who harboured parasites received routine quinine and atabrin treatment. The initiation of routine blood examinations showed that 66 per cent of those in the naval group were infected (*P. falciparum* 65, *P. vivax* 35 per cent). Of army personnel 48 per cent harboured parasites. *P. falciparum* infections predominating. The author does not

advocate the use of suppressive medication except in an area of active combat in endemic country. In the treatment of the acute case he advocates the use of quinine and atabrin combined.

A large part of the paper is concerned with the multiplicity of signs and symptoms to which malaria may give rise and which are responsive to antimalaria treatment. All patients in such hyperendemic areas should be considered as suffering from malaria until this diagnosis is disproved.

Norman White

ANNIVERS J H SNAPP F E PASKEW L IVY A C & ATKINSON
A J Retention of Atabrine in Animal Body Excretion in Bile
and Urine and Effect on Cholic Acid Output *War Medicine*
Chicago 1943 Aug 14 No 2 176-86 1 chart

A review is given of the literature. According to unpublished results by J V SCUDL when mepacrine (atabrine) is given to rats by mouth the urinary excretion is never above 1.6 per cent of the dose given on a single day but 0.5 per cent is still being excreted in the urine 13 days after the drug has been stopped. After giving an oral dose of 45 mgm per kgm Scudl recovered about 15 per cent of the dose from the liver and 2 per cent from the spleen 24 hours later. After 72 hours 10 per cent was recovered from the liver. When 50 mgm per kgm were given the liver contained 30 per cent on the first and third days 10 per cent on the eighth and 5 per cent on the 15th day. Fifteen days after the last of 10 daily doses of 10 mgm 12 per cent of the total dose was recovered from the liver.

The present authors treated rats (200 gm) subcutaneously with 5 mgm mepacrine dihydrochloride daily for five days (total 25 mgm). The rats were killed at intervals and the amount of mepacrine present in the whole body was estimated with the following results —

Days after last dose	Amount recovered
1	37 mgm
3	6.3
	3.5
10	1.33
1	31
25	0.58
40-45	trace

Five dogs were given three daily oral doses of 33-50 mgm for seven days. They were killed at intervals and the liver examined.

Total dose mgm	Days after last dose	Recovery of mepacrine from liver	
		mgm	Percentage of dose
1050	1	63.3	6.0
500	3	34.0	4.8
850	10	14.6	1.4 (Spleen 1.06 mgm)
850	1	17	2
500	5	3.58	0.1 (Muscle 0.001 mgm/100 gm)

Experiments were then made by giving mepacrine to dogs with biliary fistulae. With single daily doses of 100 mgm the percentage of the dose recovered from the bile in 24 hours was (average) 4.8 when the bile was not returned to the intestine and (average) 8.0 when the

bile was returned every 8 hours. Urinary excretion of mepacrine was 4 per cent without the return of bile and 5.2 per cent when bile was returned to the intestine. Excretion of mepacrine in the bile and urine persisted for not more than 3 or 4 days after administration was stopped and the total recovery in the two secretions was 9.7 per cent without return of bile and 11.5 per cent with return of bile. Mepacrine did not appear in the faeces of intact dogs. Accordingly it is concluded that there is no large circulation of mepacrine from bile to intestine to liver to bile again. Evidently in the dog mepacrine is rapidly destroyed or conjugated so that it is not excreted as such in the urine or bile. It is not stored in the liver, spleen or muscle to any significant extent in dogs and in rats it is removed from the body mostly within a few days completely within a few weeks. In certain cases depressions in individual dogs great variations occurred in the output of cholic acid during the administration of mepacrine but on the average the depression of output was only 2 per cent. In these animals the liver of 14-21 per cent occurred suggesting that the evidence is inconclusive but the evidence is inconclusive may possibly have suffered injury. *F. Hawking*

DAS GUPTA B M & SIDDOONS L B Studies on the Action of Different Brands of Atebrin in Human and Simian Malaria *Indian Med* 1943 June, 78 No 6 291-5

Seven cases of human malaria were treated with mepacrine hydrochloride manufactured by the Bengal Chemical and Pharmaceutical Works Ltd. The results which are recorded in detail show that its action was exactly comparable with that of atabrine. Of six monkeys infected with a virulent strain of *P. falciparum* four were treated with atabrine (Winthrop Chemical Co. U.S.A.) and two with the Bengal product. All the animals survived the primary infection with a strain which is invariably fatal if untreated. *Norman White*

WRIGHT C I & LILLIE R D Toxic Effects of Atabrine and Sulfadiazine in Growing Rats *Pub Health Rep Wash* 1943 Aug 13 No 58 No 33 1242-50 5 figs

Groups of ten rats were given mepacrine (atabrine) by stomach tube daily for eight weeks. The dose was initially 20 mgm per kgm. As the rats became tolerant the dose was gradually raised to 60 mgm per kgm. This dosage caused arrest of growth and various pathological changes in the organs. Riboflavin in doses of 5-10 mgm per kgm did not diminish these toxic effects. With a lower dose of mepacrine *e.g.* 30 mgm per kgm daily the toxic effects were only slight. The pathological changes found at autopsy consist of lymph nodes and liver an interstitial and exudative monocyctic pneumonia, a focal myocarditis and myositis and often portal thrombi and hepatic infarcts. A moderate splenic hemosiderosis and a heavy nonferrous pigmentation of the epithelium of renal glomeruli and medullary tubules are also present. Sulphadiazine alone or in combination with mepacrine produces a late growth arrest but does not cause appreciable pathological lesions. It does not increase the toxicity of mepacrine. [It must be realized that these toxic effects are produced only by very heavy prolonged dosage much exceeding that which is used clinically.]

The distribution of the lesions may be influenced partly by the route of mepacrine after absorption from the intestine which passes through the liver heart and lungs before reaching the general circulation some is excreted through the kidney] *F Hawklin*

MALAN W N Haemoglobinuria following the Administration of Plasmoquine With Note by Sidney SMITH *Trans Roy Soc Trop Med & Hyg* 1943 Sept v 37 No 2 151-6

A young soldier a native of Nyasaland was treated for subtertian malaria with quinine sulphate 30 grains daily for three days then atebain 0.1 gm thrice daily for five days and finally after an interval of three days plasmoquine 0.01 gm thrice daily for four days. Three days later his temperature rose to 100 F and he vomited on the following morning his temperature was 99 F pulse 116 and he was observed to be remarkably pale. His urine was dark chocolate in colour alkaline and gave a strongly positive guaiac test for blood. Large numbers of epithelial cells were present and a few erythrocytes. His blood was examined next day erythrocytes 1 600 000 haemoglobin 30 per cent colour index 0.92 leucocytes 16 500 blood group O. The urine was still dark chocolate in colour and contained many epithelial casts and a fair number of erythrocytes. He was given a transfusion of 12 ounces of blood although in a cross grouping test his serum produced some delayed agglutination of the donor's cells no reaction followed the transfusion.

He was treated with alkalies and iron and recovered after about a month. Haemagglutinin could no longer be demonstrated in his serum eight days after the transfusion. There had been no jaundice and the author thinks that this indicates that the haemoglobin was rapidly excreted in the urine. He concludes that plasmoquine appears to have two toxic effects the production of haemagglutinins which are not specific to the patient's red cells and the production of a haemolysin and a toxin with a direct action on the renal tubules.

Commenting on the case Brigadier Sidney SMITH suggests that it may have been one of classical blackwater fever precipitated by plasmoquine (a case of plasmoquine poisoning with similar symptoms but not associated with malaria is reported in this Bulletin 1947 v 4 741) *J I Corson*

JOHNSON C E Jr Status of Sulfonamide Therapy in Malaria *Amer J Med Sc* 1943 Sept v 206 No 3 327-36 2 figs

The author refers to his independent discovery (1942) of the anti-malarial action of sulphadiazine and sulphathiazole in patients undergoing malaria therapy with *P. malariae*. The finding of SCHWARTZ *et al* [this Bulletin 1942 v 33 601] with sulphathiazole and of COGGESHALL *et al* [this Bulletin 1939 v 36 874 1942 v 39 395] with other sulphonamide derivatives are also summarized. The observations here recorded concern 13 patients therapeutically infected with *P. malariae* and one with *P. vivax* who were treated with sulphadiazine. The strain of *P. malariae* has been in constant use for more than 10 years and has long since become asexualized. In only one case was there any intolerance of the drug; this patient vomited within a few minutes of taking it. This case is omitted in assessing the results of treatment. The daily dose of sulphadiazine given was

limited to 4 gm or less except for the first one or two days when larger doses were given to build up the blood level. The treatment lasted four days for four patients five days one patient and 10 days three patients. The total dosage varied from 24 to 48 gm. In all cases there was a cessation of fever and a disappearance of parasites from the peripheral blood. Three of the 13 patients had a relapse these had been treated for eight five and nine days respectively. One of these was a parasite relapse only without clinical symptoms. The relapses were controlled by a second course of sulphadiazine. No patient had a second relapse. The patients had been kept under observation for periods varying from 70 to 264 days after the termination of treatment. The urine of all patients undergoing sulphadiazine treatment should be examined. The appearance in the urine of sulphadiazine crystals with red cells is an indication for the discontinuance of treatment.

CURD F H S The Activity of Drugs in the Malaria of Man Monkeys and Birds *Ann Trop Med & Parasit* 1943 Sept 7 v 37 No 2 115-43 [277 refs]

In order to indicate the present position of testing for antimalarial drugs and the possibilities offered by the numerous species of avian malaria for the development of new methods of testing the activity of a large number of antimalarial drugs on human monkey and avian malaria is presented in tabular form. These tables and the author's references should prove very useful to those working on the subject but they cannot be reproduced in an abstract.

CLARA H C Review of Recent Research on Drug Prophylaxis and Treatment of Malaria *J National Malaria Soc Tallahassee Fla* 1943 v 2 No 1 31-8 [24 refs]

COLLIGNON E La campagne antipaludique de 1942 dans le département d'Alger [Antimalarial Campaign in 1942 in the Department of Algiers] *Arch Inst Pasteur d'Alger* 1943 June v 21 No 2 55-64

In spite of the presence of an abnormally large number of susceptible individuals from the hills and from abroad there were in 1942 only localized outbreaks of malaria in the Department of Algiers. March and April were unusually dry months. The usual temporary anopheline breeding places were absent and prolonged dryness caused the disappearance of what are generally persistent collections of water that are usually flushed by rain storms. Protective measures were confined to 16 centres of colonization. These consisted in the prophylactic administration of quinine or in some cases quinacrine [atebrin] to children from 1 to 15 years of age and of small scale antilarval measures including the use of Gambusia. Shortage of transport rendered impossible an adequate supervision of antilarval measures which suffered accordingly with unfortunate but very localized results.

AL CO Norman White

COCHRANE E & NEWBOLD C E Notes on Design and Performance of a Flushing Siphon *Ann Trop Med & Parasit* 1943 Sept 7 v 37 No 2 108-14 4 figs

In the Tempe valley near St George's the capital of Grenada is a stream not more than 6 feet wide at any point with a rocky winding bed a good fall and many small grassed pools productive of *A. argyritarsis*. This species is easily infected experimentally but it has never been incriminated as a vector though it is strongly suspect in the Tempe valley as elsewhere. Cochrane observed that flood during the rainy season swept the larvae of this species from their usual habitat and that a marked decrease of malaria incidence followed. It was therefore decided to reproduce these flushing conditions in the drier seasons by the installation of a flushing siphon 300 yards above the settlement. Detail are given of the construction of this siphon and dam and of the modifications that were introduced as the result of experience. The design was based on that of MacDonald's modification of de Villiers automatic siphon. An unexpected complication was the frequent blocking of $\frac{3}{4}$ in pipes by rayfish that abound in the stream. The improved design that is suggested at the end of the paper as the result of experience should be of interest to all faced with similar problems. When the siphon worked well mosquito breeding was almost eliminated for 400 yards downstream and was markedly less from 400 to 800 yards below the dam.

Norman White

BOJ OFICINA SANITARIA PANAMERICANA 1943 June v 2^o No 6 502-5 English summary Aspectos de la campana antipaludica en la Republica de Panama Antimalaria Campaign in the Republic of Panama

This is a brief account of routine antimalaria measures carried out by the Malaria Section of the Ministry of Health and Public Works of the Panama Government. Centres of population in the interior of the country more than 300 mosquito breeding places are kept under constant observation and control. These breeding places are of various kinds those that are deprived of vegetation and exposed to the sun are the most dangerous in that they are productive of *A. albimanus* which is by far the most important vector. Other species found are *A. argyritarsis*, *A. pseudopunctipennis*, *A. apicimaculata*, *A. punctimaculata*, *A. albivittata*, *A. strodei* and *A. ioniaculipalpus*. Isoniazid is faoured as a larvicide. Nothing is said of the intensity of malaria endemicity in the interior of the country. The spleens and blood of school children are examined periodically and health propaganda effort are achieving some success.

Norina White

NESTERWODSKAJA K. M. & LUBINSKI G. A. Anwendung von Thiodiphenylamin in der Anopheleslarvenbekämpfung [Phenothiazine for the Control of Anopheles Larvae] *Deut Trop Ztschr* 1943 May 15 47 No 10 250-60 6 figs [23 ref.]

The author confirm the high toxicity of phenothiazine (thiodiphenylamine) to mosquito larvae. Dosages of 0.5 and 1.0 mgm per 100 sq cm at 18-21 C killed all stages of Anopheles larvae in the laboratory in 24 and 6 hours respectively. Contact with the poisonous dust for 1-1½ hours was sufficient to cause the ultimate death of the larvae. Under the same conditions only 40-50 per cent of Culex larvae were

killed. In field trials at 12-13 C with dosages of 7 and 14 oz per acre all *Anopheles* larvae had disappeared in 48 hours. Phenothiazine is not less toxic to fish than Paris green. A dosage of 1 mgm per 100 sq cm in an aquarium killed 10 per cent of the fish in four days. But it is practically harmless to mammals. I B Hogg's orth

ROY A & MUKERJEE S. Some Observations on the Complement in the Serum of Monkeys during Infection with *Plasmodium knowlesi*. *Ann Biochem & Exper Med* 1942 v 2 No 4 245-50

In normal monkeys the complement content of the blood serum is such that on an average one unit is contained in 0.2 cc of 1 in 5 dilution of serum. During the incubation period and the early phases of *Plasmodium knowlesi* infection there is little variation from this figure. In the later stages of the infection when more than 20 per cent of the red blood corpuscles harbour parasite there is a rapid depression till on an average during the last 24 hours before the fatal termination one unit is contained in 1.04 cc of the diluted serum. In monkeys which survive the acute infection and pass into a chronic phase there is little variation from normal. C M Henson

BARANCEI P & THOMAS P E. The Action on Avian Malaria of the Alkaloids of Cinchona from the Cameroons and the Belgian Congo. *Biochem J* 1943 Sept v 37 No 3 342-4 22 refs

The authors have carried out tests on avian malaria with a view to the estimation of the therapeutic efficiency of *Cinchona succinifera* and *C. ledgeriana* from the Cameroons and the Belgian Congo. The tests were made on canaries inoculated with *Plasmodium relictum* the drugs having been administered in the form of pellets with cornflour which the birds readily swallowed. The tests indicated that the total alkaloids had an effect similar to if not better than that of quinine. Industrial and laboratory prepared materials were of equal value. The total alkaloids from which the quinine had been extracted had a poor therapeutic effect. C M Henson

ADLER S & TCHERNOMORETZ J. The Development of Gametocytes from Extra Erythrocytic Forms in *Plasmodium gallinaceum*. *Harefuah* Jerusalem 1943 Sept 1 v 25 No 5. In Hebrew English summary 83]

Adult fowls shortly after inoculation with *Plasmodium gallinaceum* by the bites of mosquitoes *Aedes aegypti* were subjected to intense quininisation (injections of 150 mgms quinine hydrochloride daily). Quininisation was stopped when the red cells showed a sufficient infection with small non pigmented parasites. The extra erythrocytic forms were the only possible source of these parasites in the red cells. The development of the parasites in the red cells after cessation of quinine was studied.

It was found that young gametocytes could be recognised 27½ hours after the cessation of quinine and they approach their maximum size before the first cycle of erythrocytic schizogony is completed. It is therefore proved that extra erythrocytic forms produce merozoites which invade red cells and develop directly into gametocytes.

ZAIN H & WOLF A Einfluss der Rontgenstrahlen auf die Entwicklung der Endothelstadien der Voelmalaria (*Plasmodium gallinaceum*) [Influence of X Rays on the Development of the Endothelial Stage of Bird Malaria (*P. gallinaceum*)] *Deut Trop Ztschr* 1943 Feb 1 v 47 No 3 68-71

With the object of discovering whether exoerythrocytic schizonts are affected by exposure to Rontgen rays thin slice of brain of fowls containing these developmental forms of *Plasmodium gallinaceum* were exposed to rays in varying doses. Subsequently the treated brain material was inoculated into the breast muscles of uninfected fowls. At the same time similar portions of untreated brain were inoculated to other birds. In no case was there evidence that the schizonts in the treated brains produced more or fewer schizonts than were produced by those in the untreated brains. In another series of experiments the fowls themselves were exposed to rays immediately or soon after the inoculation of brain containing exoerythrocytic schizonts. In most cases there was no evidence of increase or decrease in the expected number of schizonts which appeared subsequently in the brains. In a few cases however there was an indication that an increase had occurred and this was in the case of fowls exposed to small doses of rays. An explanation of this may be found in the fact that exposure to such doses is known to activate the reticulo-endothelial system as evidenced by an increased phagocytosis of injected pigments. It has also been shown by SCHULEMAN and HACHE (this Bulletin 1940 39 25) that the injection of colloidal palladium not only activates the reticulo-endothelial system but also increases the number of exoerythrocytic schizonts which develop in the brain of inoculated fowls.

C M Henson

RUSSELL P F BADRI NATH MOHAN & PUTNAM P Some Observations on Spleen Volume in Domestic Fowls in the Course of *Plasmodium gallinaceum* Studies. *J Parasitology* 1943 June v 29 No 3 408-16 1 fig (11 refs)

The authors have studied the volume of the spleen in normal fowls in those subjected to inoculations with sheep serum or inactivated sporozoites or infection with *Plasmodium gallinaceum*. In some fowls a combination of injections and infections was studied. The average volume of the spleen of 17 normal fowls 10 weeks old was 0.89 cc. Vaccination with inactivated sporozoites or serum from normal sheep as also serum from fowls suffering from chronic malarial infection brought about an increase in volume of the spleen due chiefly to increase in the lymphoid tissue. Malarial infection produced enlargement and there was no significant difference between blood inoculated and mosquito-infected groups. As the infection became chronic and progressed the volume decreased. The largest increase occurred in fowls with chronic malaria which had been subjected to both vaccination and serum treatment.

C M Henson

WOLFSON F Further Studies of the 3T Strain of *Plasmodium cathemerium* in White Pekin Ducks. *Amer J Hyg* 1943 May 37 No 3 325-35 8 figs on 2 pls

The author has already shown that ducks can be infected with the 3T strain of *Plasmodium cathemerium* which was isolated from a

wood thrush and established in canaries in 1937. Though exoerythrocytic schizonts were found in a canary infected by sporozoites of this strain and in all the canaries infected subsequently by blood inoculation these forms have never been detected in ducks. Though the infection in the ducks reached an intensity of 4 000 parasites per 10 000 red cells the ducks invariably recovered and remained in a state of chronic infection. On this account the infection in the duck was of less value for chemotherapeutic work than that of *P. lophurae* which invariably gave rise to more intense infections which terminated fatally. With a view to a possible modification of the infection produced by the 3T strain a series of rapid passages was carried out after inoculation of large doses of infected red cells. It was determined that the cycle was one of 24 hours and that the procedure adopted increased the intensity of the infection in the duck to such an extent that in some cases it proved fatal. The conclusion is that the type of infection is one which may prove satisfactory for malarial particularly chemotherapeutic research.

C M Henson

ERRATUM

In the abstract of the paper by GLAZKO on the estimation of quinine in urine [this *Bulletin* 1943 v 40 880] an error was made in the description of technique. On page 881 line 11 for "To 5 cc of urine in a test tube 5 cc of the reagent are added" read "To 5 cc of urine in a test tube 5 drops of the reagent are added".

BLACKWATER FEVER

FINDLAY G M Mobile Blackwater Fever Treatment Teams J
Roy Army Med Corps 1943 Sept v 81 No 3 113-18 2 figs

A person suffering from blackwater fever needs medical treatment and skilled nursing night and day as soon as possible. He also requires absolute rest in bed. It is therefore often necessary to visit and treat him in places far distant from a hospital. In the present military conditions in West Africa these difficulties have been met by trained blackwater fever teams stationed at all General Hospitals and at most of the Casualty Clearing Stations. Each hospital team consists of one Medical Officer, one or two Nursing Officers [sisters] and two Nursing Orderlies, but teams provided by Casualty Clearing Stations have no Nursing Officers and have instead two additional Nursing Orderlies. The team should be ready to leave its station at an hour's notice. The equipment in addition to the personal requirements of the team includes the materials for infusion and blood transfusion for blood grouping and for microscopical examination of the blood, quinine, atabrin and other drugs, eight oxygen cylinders, beds and bedding.

and general nursing equipment cooking utensil milk tea sugar champagne fruit drinks &c. These are given in a list containing 134 items but no stain for blood films is included.

It has sometimes happened that no medical officer or blackwater fever team has been available for some hours so instruction for giving first aid have been issued these emphasize complete rest in bed the administration of weak tea with sugar and of alkaline drinks and the immediate despatch of a messenger to call medical aid. These arrangements have been an important factor in reducing the mortality of blackwater fever

J. F. Corson

ROBERTSON, F. A Case of Blackwater Fever *Newcastle Med. J.*
1942 Dec. 1, 21 No. 4 115-21

The author describes a severe case of blackwater fever following malaria contracted on the Gold Coast with recovery after treatment by repeated blood transfusions. In an endeavour to prevent circulatory overload in the final transfusion consisted of the cell of two pints of blood given at the same time as a corresponding volume of the patient's own blood was withdrawn.

F. Muirhead

TRYPANOSOMIASIS

GAMBIA ANN. MED. & SAN. REP. FOR YEAR ENDED 31ST DECEMBER
1942 Appendix II 9-11 Extract from Captain MacGowan's
Report on Gambia Sleeping Sickness Survey undertaken with the
Permission of D.D.M.S. West African Forces

Notes on surveys in three areas are given in this extract from Captain MacGowan's report on the north bank of the River Gambia the people of villages in the Lower Baddibu district were examined while the other two areas (Bintan Bwiam and Landunda Sintet) are on the south side of the river.

In the Lower Baddibu area the infection rate was 1.4 per cent while in 1939 it was found by BOWESMAN to be 4.2 per cent. In Kerevan itself in this area the rate (0.9 per cent) was only one seventh of that (6.9 per cent) found by Bowesman. This reduced rate is attributed to the treatment of cases in the Kerevan Civil Dispensary during the last 3-4 years in this dispensary there were no facilities for macroscopical diagnosis but the author thinks that about 10 per cent of the diagnoses were correct. On the south side of the river however around Bwiam Hospital similar conditions exist for treatment yet the incidence of trypanosomiasis here was at least as high as that found by Bowesman. It is estimated that 6 out of 7 infected natives will not come for treatment. Excision of cervical glands still practised by the natives [see TODD & WOLBACH *Sleeping Sickness Bulletin* 1941 1, 3, 336].

The author says that a trypanosomiasis campaign is urgently needed and a larger Medical Service is required it is necessary also to educate the people in practical farming

J. F. Corson

HOPKIN H E & FRENCH M H Introduction to the Study of Tsetse-Fly Repellents in the Field of Veterinary Science *Trans Roy Soc Trop Med & Hyg* 1913 July v 37 No 1 41-54

The authors report work directed towards the protection of domestic animals from tsetse

The problem is peculiarly difficult for one might protect man or animals from insect annoyance if one could reduce the attacks to a small number. But in the present case that would be insufficient for the purpose is to protect from deadly trypanosomiasis and of the flies some 7 to 10 per cent are infective. Moreover work of Dr E BLITT here reported for the first time shows that trypanosomes are ejected in large numbers as soon as the tsetse's proboscis enters the skin so that a fly which probes as distinct from sucking can in actual fact transmit the infection. In addition it is clearly desirable that the repellent should be effective for at least 24 hours and it must be available in quantity easy to apply and so forth.

The authors developed a standard series of tests in which conditions more and more approached the natural. They eliminated substances at successive stages in the testing for repellency and for harmlessness to an ox. They were finally left with no satisfactory material except pyrethrum extract. An instructive field test is described in which three donkeys sprayed each morning with pyrethrum extract (2 per cent pyagra emulsion) and two control donkeys performed a five day journey through a *Glossina morsitans* belt. Flies in numbers bit and worried the controls but not the treated donkeys. The experiment remained inconclusive for no animal died of trypanosomiasis (except one control after two months).

The pyrethrum gave good protection in the shade much less in sunlight. [It seems possible that a good pyrethrum chemist might help here. The authors appear to assume that it is the pyrethrins which are repellent and this may be so though no evidence is brought forward. Much more work clearly remains to be done after the war when it will be easier to obtain more precisely standardized extracts.]

The paper contains a long and varied list of materials tested and found useless. They range from simple salts to a mixture of kerosene fish oil and citronella oil emulsified with milk. P A Burton

PACKCHANIAN A On the Viability of various Species of *Trypanosoma* and *Leishmania* Cultures *J Parasitology* 1943 Aug v 29 No 4 275-7

The author has investigated the survival time of trypanosomes leishmania and herpetomonas when cultivated in Novy and MacNeal's blood agar medium. The temperature at which the cultures were kept varied from 18 to 31°C. Out of 124 tubes of *Trypanosoma cruzi* kept for approximately 6 years 13 tubes were found to contain actively motile trypanosomes. Of 291 tubes kept from 7 months to 5 years 11 contained active trypanosomes while of 110 tubes kept about 6 months 68 contained motile trypanosomes. The viability of culture of *T. atium* and *T. rotatorium* was 3 and 4 months respectively when kept at a temperature not above 25°C. Cultures of *T. americanum*, *T. duttoni*, *T. lewisi*, *T. melophagium*, *Leishmania donovani* and *I. tropica* were negative for motile forms at the end of four months in many instances however subcultures were obtained at the end of two

months and sometimes during the third month. A culture of *Herpetomonas muscae do nesticae* was once found to be viable on blood agar slants after a period of six years.

C. M. Henson

MAZZA S. & CHACO R. V. Presencia de *Panstrongylus geniculatus* con infestacion por *S. cruzi* en el oriente boliviano y otras informaciones relacionadas con la enfermedad de Chagas en esa region [Infestation of *Panstrongylus geniculatus* with *T. cruzi* in Eastern Bolivia. Chagas's Disease in this Region.] Reprinted from *Prensa Med Argentina* 1943 June 23 & 30 No 27 15 pp 4 figs

Up to 1912 three transmitters of *T. cruzi* were known in Bolivia namely *Triatoma infestans*, *Eutriatoma sanguinolenta* and *E. venosa*. In 1942 Mazza found two more *E. oswaldi* in dwellings in Sucre and its environs and *Psammolestes coreodes* in birds' nests in Camiri. Infested insects *Triatoma infestans* were found as high up as Cochabamba 2509 metres and other adjacent places and as low down as Santa Cruz de la Sierra 442 metres. The numbers of insects examined were small: 10 in Quillacollo (— positive), 5 in Santa Cruz de la Sierra (2 positive), 21 in the southern parts of the district (1 positive) at another time 6 positive out of 17 and so on [the authors record these as 20, 40 and 50 per cent respectively which is inclined to mislead]. In the department of El Beni at Trinidad the capital 236 metres above sea level a male *Panstrongylus geniculatus* was captured in a house and found to be infested with evolution forms of *T. cruzi*. A child in a nearby house had suffered from fever for two months and had a swollen face and abdomen and some general oedema. Six blood smears were examined but no parasites found. Also 88 children between 6 and 16 years of age from a school were examined but none was found positive. The authors refer to several patients presenting the clinical signs of Chagas's disease but in no instance did they find the trypanosome and xenodiagnosis when tried was negative. [In spite of this the authors claim to have shown that Chagas's disease exists both at high and low levels and that *Panstrongylus geniculatus* has now for the first time been recorded as a local transmitter.]

H. Harold Scott

WOOD S. F. Observations on Vectors of Chagas Disease in the United States II. Arizona. *Amer J Trop Med* 1943 May & 23 No 3 315-20

This investigation was carried out at the Alvarado Mine, Arizona. During the periods May–October 1940 and June–September 1939 and 1941 cone-nosed bug (male and female adults and nymphs) were collected and examined. Over the whole period 1022 specimens were collected and 570 examined. 28 (4.9 per cent) were infected with *T. cruzi*. This brings the total of insect vectors of this trypanosome collected from Arizona to 1652. 699 have been examined and 28 (4 per cent) found infected. The chief were *Triatoma rubida* and *T. lonipes*. These are not very strong fliers particularly the latter and they are probably assisted by the early evening down-canyon breezes.

In the Alvarado Mine *T. lonipes* is the most important vector; it is the most abundant and the more highly infected is closely associated with man and has a large capacity for ingesting blood.

The wood rat *Neotoma albigula albigula* is remarkably resistant to or tolerant of bites of these insects. Thus over a period of nearly six months December 8th 1940-June 15th 1941 bugs fed at least 1 016 times on one of these rats and on one day a *Rattus norvegicus* served to feed 164 nymphs of *T. rubida* and 12 of *T. longipes* without any apparent harm to the rat.

Xenodiagnostic experiments with native mammals *Corynorhinus rafinesquii pallascens* *Neotoma albigula albigula* *Peromyscus crinitus stephensi* and two *Felis domesticus* have all given negative results.

H. Harold Scott

LEISHMANIASIS

GIPAUD P & REVOL P. Quelques données récentes sur le traitement du kala azar. Some New Ideas on the Treatment of Kala Azar. *Presse Méd.* 1943 June 5 v. 51 No 21 291-2.

The authors who have had considerable experience of the treatment of infantile kala azar in the South of France give an account of the treatment of a number of cases with pentastib an organic antimonial (aminophenylstibinate of methyl glucamine containing 6.5 per cent of antimony) which they were obliged to use owing to the impossibility of procuring other products. This drug which was primarily intended for veterinary use was administered intravenously in the doses suitable for neostibosan i.e. 2 to 20 cgm for children under five years of age and 5 to 30 cgm for older children and adults. [The antimony content of neostibosan is given as 42 per cent.] Three injections were given each week the full course extending over five weeks (15 injections). To bring about a cure three courses were often necessary. The drug resembled neostibosan as regards tolerance but it was perhaps less effective. The authors state that ureastibamine is the best tolerated and the most effective of all the antimonials they have used.

The authors have also treated cases with 4-4 diamidino diphenoxy pentane [pentamidine]. The dose employed for intramuscular injection was 1.5 to 2 mgm per kgm of body weight. Three injections were made each week the full course comprising 12 to 15 injections. Of 11 cases treated with this drug four had previously been treated with an antimonial. The drug was well tolerated though the injections were painful and often led to the appearance of several drops of blood at the puncture wound. The temperature quickly fell to normal but the spleen was slowly reduced in size. Four of the patients were cured by the use of this drug alone in two to three months but for the others of the series subsequent antimony treatment was necessary. The authors conclude that pentamidine is a drug of low toxicity liable to cause only local troubles. It is very useful for the commencement of treatment in very young children and in cases with severe forms of the disease. In effectiveness it resembles the antimonials with the exception of ureastibamine which in their opinion still holds first place. In one case which was resistant to antimonials and to

pentamidine splenectomy was performed. It seemed that a cure was effected but some months later death occurred from pneumococcal meningitis.
The present cure rate based on the last 67 cases treated by the authors is 85 per cent. C. M. Henyon

REY H. Cellular Reactions in the Dermal Connective Tissue of Hamster to *Leishmania brasiliensis*. *J Infect Dis* 1943 May-Apr 2 No 2 117-24 21 figs on 1 pl [28 refs]

The author has studied the local reaction which follows the injection into the subcutaneous connective tissue of hamsters of cultures of *Leishmania brasiliensis*. This is of an inflammatory nature indicative of natural immunity. He traces the cellular changes which take place and which lead to the complete destruction of all parasite in 36 hours as a result either of digestive processes within phagocytic cells or of the action of proteolytic or parasitidal substances which are present in the connective tissue or are derived from the plasma. The phagocytic cells are chiefly the polyblasts derived from the local macrophage and lymphoid anastomosing cell and the heterophiles which migrate from the blood by active diapedesis through the walls of the regional capillaries and eosinophilic endothelial cells apparently play no part in this process. The injected flagellates are quickly transformed into leishmania some of which after phagocytosis show signs of multiplication before they are overcome by the intracellular destructive processes. C. M. Henyon

PERCE H & PARDO L. Notes on Cutaneous Leishmaniasis and *Phlebotomus* in the Province of Andahuaylas Peru. *Amer J Hyg* 1943 May 37 No 3 255-8 1 map

Though cutaneous and mucocutaneous leishmaniasis are known to exist in various parts of Peru there has hitherto been no information regarding the presence or absence of sandflies which have been reported from all other endemic areas of the disease in the Americas. The authors having the opportunity of searching for sandflies of Andahuaylas took the opportunity of searching for sandflies in the Province. The altitude of these areas which the cutaneous form alone occurred. The altitude of these areas varied from 900 to 2500 metres. In only four of the areas was it possible to conduct a search for sandflies and in all four they were found. The sandflies included those described forms which have been named *Phlebotomus pescei* and *P. ballistarius* by Dr Marshall HERTIG. Batches from certain areas were lost before they could be identified. C. M. Henyon

HERTIG M. Notes on Peruvian Sandflies with Descriptions of *Phlebotomus* sp. and *P. pescei* n. sp. *Amer J Hyg* 1943 May 37 No 3 46-54 16 figs on 2 pls

FEVERS OF THE TYPHUS GROUP

McCONN C F Observations on a Typhus Epidemic *Lancet* 1943
Oct 30 535-7

The last serious epidemic of typhus fever in the Spiddal area of West Galway was in 1903-04 the present outbreak was in September to November 1942. The first two cases were missed having been regarded as typical bronchopneumonia. The third case was diagnosed on the operating table while the patient was on the point of being explored for a suspected pelvic abscess. Investigation showed that influenza was prevalent in the locality especially among school children and several cases were found in which a bluish red or slate blue rash was detected in the epigastric region.

In an area with a total population of 2 222 a selection was made of 537 persons who were suspected of having the disease or of being contacts or who were verminous. Of these 14 were found to have typical attacks of typhus fever with positive Weil Felix reactions. Of 119 persons with a history of illness during the preceding month 89 had positive reactions with titres ranging from 1-50 to 1-320. Of 110 who had been ill more than one month and less than three months previously 14 were positive 1-100 7 1-50 and 9 1-25. Of the 292 who gave no history of illness 16 reacted 1-50 and 3 1-25. There was only one death during the epidemic the total number of cases is not stated. Among the 535 persons investigated head lice were found in 289 and body lice in 200.

The steps taken to control the epidemic were the establishment of a special hospital for isolation disinfection and disinfestation and the imposition of quarantine on the affected area.

Another outbreak occurred at Carraroe in East Galway this was traced to a case that had occurred a month before the disease was suspected two persons who had attended the wake of the original patient were attacked. A third outbreak is mentioned this occurred at Carna also in Co Galway in 1941. A man died without having been seen by a doctor a fortnight later his family were attacked by influenza and were looked after by the district nurse who later was attacked by typhus fever.

Weil Felix tests were carried out later on the seven surviving members of the family one was positive 1-125 five were positive 1-50 and one 1-25.

Control specimens of serum were taken from 51 persons in various unaffected localities in Co Galway only three were positive at 1-125 1-50 and 1-25 respectively. The reactor at 1-50 was found to have been previously in contact with a patient in the 1936 outbreak and to be verminous the reactor at 1-125 was exceptionally clean and healthy there was no obvious explanation of the reaction.

John W D Megaw

STUART HARRIS C H RETTIE G K C & OLIVER J C Rickettsial
Agglutination Studies in Typhus Fever *Lancet* 1943 Oct 30
537-8 [11 refs]

The results of agglutination tests carried out on nine persons who had been attacked in the Spiddal outbreak described above are shown in the table. The Pickettsial suspensions were prepared from

he lumps of mice inoculated by the intranasal route. The murine rickettsiae were of the Wilmington strain the two epidemic strains were the Breml and a recent strain isolated by VAN ROOYEN at Cairo in 1942.

TABLE I

4. *Results of Proteus and Rickettsia by Sera of Irish Cattle*

Case	Duration of convalescence (months)	Protein			Rickettsiae		
					Murine	Epidemic	
		OVI9	OV	OVA		Breml	Cairo
T1	3	∞	125	50	160	640	640
T2	3	50	125	50	40	320	160
I1	4	125	50	50	0(20)	0(40)	0(40)
I2	5	125	50	125	50	320	160
OD1	2	250	125	125	50	50	50
OD2	2	125	125	125	50	320	50
OD3	2	125	125	125	0(20)		0(20)
L1	2	0(25)	0(25)	0(25)	0(20)	0(40)	40
L2	2	50	50	50	0(20)	0(40)	50

Figures in parentheses are lowest dilution of serum tested which failed to give agglutination.

On the assumption that *Proteus* OVI titres in excess of 1-50 are significant the positive reactions to OVI9 were five in two of these and in one other the reaction to OV was positive. Seven sera reacted to the Cairo strain of Rickettsia two of these were negative to the Breml and murine strain. Five sera reacted with all three Rickettsial strains. Four of these gave stronger reactions with the epidemic than with the murine strain the other reacted equally with all three.

The results confirm the belief that some at least of the patient had been infected by *Rickettsia* *breml*.

Of sera taken from 45 healthy persons only two agglutinated *Rickettsia* *breml* ones of the murine type (at titres of 1-40 and below) none agglutinated epidemic strains.

Sera of guinea-pigs and rabbits infected with Rickettsiae did not agglutinate OVI9 but did agglutinate Rickettsial suspensions. Whether the murine or the epidemic strain were used for inoculating the animal there was agglutination for both strains but the titre was always considerably higher for the epidemic strain.

In four human cases the titres were —

	Day of disease	Murine Rickettsia	Epidemic Rickettsia	P OVI9
Murine (laboratory mouse)	14	640	320	40
Murine (Middle East)	11	1250	640	500
Epidemic (laboratory mouse)	12	125	640	50
Epidemic (Middle East)	24	125	10240	5000

The patients with laboratory infections had been immunized with epidemic typhus vaccine

These findings are regarded as giving presumptive evidence that human cases of typhus can be classified as murine or epidemic by Rickettsial agglutination tests

John H D Megaw

STELFR W Ueber die serologische Diagnose und Schnelldiagnose bei Infektionskrankheiten [Serological Diagnosis and Rapid Diagnosis in Infectious Diseases] *Ztschr f Immunitätsf u Exper Therap* 1943 June 10 v 103 No 2 137-50

This article deals chiefly with the dry blood agglutination test of KUDICKE and STELLI. This test which has been widely adopted in Germany is claimed to have proved a valuable method of rapid diagnosis especially in connexion with the detection of typhus in suspected communities. WOHLFAB has claimed that it gives a positive finding one or two days earlier than the Weil Felix reaction. In one quarantine post 29 cases of typhus were detected within two months many of these could not have been detected by clinical examination and 25 per cent of them gave negative reactions with the Weil Felix test. One expert describes the test as an excellent and quite indispensable method.

It is subject to the same general limitations as the Weil Felix and other agglutination reactions especially in the matter of the activity of the bacterial suspensions and in the occurrence of misleading results. In spite of a large number of possible fallacies the Weil Felix test remains firmly established as a valuable diagnostic aid especially in the numerous cases in which the clinical symptoms are not characteristic. In one institute the Weil Felix reaction was carried out in large numbers of cases other than typhus about 10 per cent of these cases reacted at 1-50 45 per cent at 1-100 and only 0.4 per cent at 1-200 or over. In two cases of icterus a titre of 1-6400 was observed and in another a titre of 1-800. In one case of dysentery and one of intestinal tuberculosis the titre was 1-3200. In all these cases of high titre reaction the non specific agglutination was probably due to the presence of *Proteus* organisms in the intestine.

The standard of diagnostic accuracy is higher than that of the Widal reaction. In typhus and typhoid fevers complications arise from protective inoculation. Agglutination tests are not satisfactory in the case of dysentery due to *Flexner* organisms in these the reaction is often weak or negative and false positives are common in healthy persons. Shiga Kruse bacilli are much more specific in their reactions titres of 1-200 or over are observed in most cases during the second to the fourth weeks. Agglutination tests are seldom helpful in infections caused by the Kruse Sonne bacilli. In undulant fever and tularaemia agglutinins are produced with considerable regularity.

In all these diseases the dry blood test is very useful because it gives an immediate reply to the question of diagnosis. Except in the case of *Proteus* organisms killed suspensions are employed. Sera whose Weil Felix titres are lower than 1-100 or 1-200 do not react to the dry blood test but those giving high and therefore significant titres are uniformly positive. The skin must be freed from traces of antiseptic before the blood sample is taken and the blood must flow without pressure. Each droplet should be spread so as to cover a circular area of 1 cm in diameter and no heat should be used in drying. If the

bacterial suspension has been kept in the refrigerator it must be allowed to reach room temperature before being used. The blood film must not be scratched during or after the application of the suspension.

The problem of obtaining formal killed suspensions with good keeping qualities has still to be solved. Bacterial culture spread on smooth firm strips of filter paper and dried at once can be kept in stock and used as required for making suspensions. Specific agglutinating sera can also be kept in the dried condition on strips of filter paper and used for testing the activity of suspensions. [See also this Bulletin 1947 v 39 372 1943 v 40 529 600 John H D Mac

GAASE Untersuchungen ueber die Thermostabilität der Fleckfieber agglutinine gegen *Proteus O19* Bazillen. Investigation into the Thermostability of Typhus Agglutinins against *Proteus O19*. *Ztschr f Infektionskrankh u Exper Therap* 1943 June 10 103 No 2 15-60

Sera whose titres of agglutination for *Proteus O19* were known were heated for half an hour at different temperatures and again tested. Heating to 56°C did not affect the titre in 67 per cent of the cases; in the other the titre was lowered but the reaction remained positive. Heating to 60°C abolished the reaction in 60 per cent of the cases; it caused a great reduction in the titres of most of the others. Heating to 65°C caused almost complete inhibition of the reaction and a temperature of 70°C abolished the reaction in all cases.

A further experiment was carried out to determine the degree to which each of the factors concerned in agglutination was affected by heating. These factors are: (a) the haptophore group or agglutinoid which combines with the bacterial antigen and renders it inactive but does not cause agglutination of the bacteria; and (b) the more thermolabile zymophore or agglutinating serum which causes clumping.

When an agglutinating serum is heated to a temperature high enough to destroy the zymophore group (a) and after a mixed antigen becomes fixed so that the organisms cease to be agglutinable by the addition of the original unheated serum. If the serum is heated to a temperature at which both groups are destroyed there is no clumping, but if fresh unheated serum is added clumping occurs at the original titre.

In the present experiments 29 sera of known agglutination titres were heated to 60°C for half an hour. In 10 cases the titre remained the same; in 11 it was lowered usually to a great extent; in 16 the reaction became completely negative. The addition of the corresponding unheated serum to each of the samples under test caused full restoration of the agglutination titres in 17 cases; partial restoration in four; and no restoration in eight. The eight that remained negative belonged to the group of 15 in which the reaction with heated serum had become negative. In the conditions of the experiments the agglutinating group was inactivated by heat more often than the haptophore group, which in the 15 cases in which the same was the case was completely inhibited by heating. The results of the experiments with *O19* would be additional evidence of the specificity of the Weil-Felix reaction.

John H D Mac

MEYER R Die OX₁₉ Agglutination bei Fleckfieberschutzgeimpften und ihre Bedeutung für die Fleckfieberdiagnose [The Agglutination of *Proteus OX19* after Typhus Inoculation Its Significance in Diagnosis] *Ztschr f Immunitätsf u Exper Therap* 1943 July 5 v 103 No 3 165-9

Of 312 persons inoculated with Weigl's vaccine and tested at varying intervals afterwards only two agglutinated *Proteus OX19* at titres in excess of 1-50. One of these reacted at 1-100 and the second who had had an attack of typhus fever three months previously in spite of inoculation reacted at 1-400. Three other persons who had typhus after inoculation and three months or more before being tested reacted at 1-50 only.

The number of weakly positive reactions after inoculation tended to increase up to three months and after seven months it usually declined though after as long as 16 months the reaction might be ++++1-50 whereas 14 days after inoculation it was usually +1-50.

Little difference was noticed between the reactions following first and those following second courses of inoculation.

Twenty persons whose post inoculation reactions varied from \pm 1-50 to ++++1-50 were given intramuscular injections of omnadin which have been found to produce amnesic reactions similar to those due to febrile attacks. Four days later 16 of these reacted \pm 1-100 to +1-100 and two reacted \pm 1-200.

It was concluded that inoculated persons may have Weil Felix reactions in titres up to 1-200 in fevers other than typhus.

John W D Megaw

MEYER R Erfahrungen bei der behelfsmässigen Zubereitung von Konvaleszentenserum [Experiences in the Improvised Preparation of Convalescent Sera (for the Treatment of Typhus)] *Ztschr f Immunitätsf u Exper Therap* 1943 July 5 v 103 No 3 169-74

In 94 typhus patients treated with doses of 125 cc of convalescent serum given intravenously on the second or third day the fatality rate was 6.4 per cent against 14.7 per cent in the control group. Cases in which the agglutination titre was less than 1-800 were excluded from consideration and no mention is made of the manner of selection of the controls except that they belonged to the same age groups as the test cases. The author points out that the figures do not provide statistical proof of the efficacy of the treatment.

There were 464 donors from each of whom 200 to 400 cc of blood were taken usually on the 14th to the 16th day after the end of the fever. The blood of compatible groups was mixed small amounts of residual agglutinins for red blood corpuscles could be ignored in view of the fact that the blood of the recipient could neutralize many times the amount contained in 125 cc of serum.

The blood mixture was kept at room temperature this was 2 to 6 C during the early stages of the tests. The serum was drawn off and passed through a Seitz EK filter of a type that could be sterilized by a current of steam. The front plate which was liable to escape sterilization by this means was first heated with a blow lamp. Serum

separated by standing in the cold contained a little haemoglobin and tended to become turbid and flocculent after a few weeks. When the room temperature rose to 12°C the addition of phenol to the serum was contemplated but it was found by experiments on healthy persons that normal serum with the addition of 0.4 to 0.5 per cent phenol caused unpleasant reactions when given in the requisite doses. Smaller quantities of phenol are found to be inadequate. A high-efficiency centrifuge was therefore necessary when low temperatures were not available in order to obtain the serum quickly and so a cold undue multiplication of bacteria. Each flask of serum containing 200 cc was tested for sterility by aerobic and anaerobic cultures observed over a period of eight days.

John H. D. Megaw

Dr. E. Leber die Schutzwirkung verschiedener Fleckfieberimpfstoffe beim Menschen und den Fleckfieberverlauf nach Schutzimpfung. [The Protective Effect in Man of various Typhus Vaccines and their Influence on the Course of the Disease. *Ztschr. f. Hyg.* 1943 June 15 124 No. 6 670-82 2 figs. 17 refs.]

During the three winters 1940 to 1943 comparative investigations were carried out in groups of patients suffering from typhus who had been vaccinated six to eight weeks previously by six types of vaccine and in two control groups. A summary of the findings is given in the table.

The number of persons in each group is not stated but is said to have been approximately the same in all. The conditions were comparable except that the average age of the vaccinated was 32 years and of the control 31.2.

All the symptoms were on the average much more severe in the controls especially those associated with the nervous system. There was no evidence that vaccination had any influence in preventing attack. The vaccine comes made of mixtures of *R. prowazekii* and *R. nosodes* are considered to give less good protection than those made of *R. prowazekii* alone and they are no longer in use.

This paper supplies convincing evidence of the efficacy of killed vaccines of the Cox and other types in preventing death from typhus fever.

It is likely to attract attention in circles outside the medical profession because of internal evidence which points to remarkable conditions connected with the investigation. An editorial article in the *Lancet* (1943 Dec. 18 p. 770) entitled *Typhus Vaccines—A Critical Experiment* contains the following comments:—The author describes him self as a storm troop leader, the percentage figures show that each group must have comprised a large number of persons (an incidence of complications of 0.5 per cent suggests at least 200 in one group) the day of infection on which has been known in each case and the incubation period as much shorter than is accepted for typhus acquired in natural conditions.

The article concludes:—Thus it seems that particularly heavy infections occurred in some hundreds of persons on known days during the investigations of a storm troop leader. We leave our readers to make their own deductions.

	Reactions after each dose (percent-age)			Incubation period in days		Duration of fever		Complications (per cent)	Deaths
				Average	Range	Average	Range		
1 Weigl's Vaccine	94	86	96	6-7	4-11	11	6-16	0	0
2 Cox type (<i>R. prowazeki</i>)	50	44	50	6-7	2-11	10	5-13	0	0
3 Yolk sac (<i>R. prowazeki</i> and <i>R. mooseri</i>)	32	96	36	6-7	2-9	12	7-17	0.5	1
4 Ditto (strong)	36	50	40	6-7	2-9	12	8-16	3	1
5 Giroud type (rabbit lung)	20	40	30	6-7	2-11	10	6-14	0	0
6 Combiesco type (dog lung)	15	25	40	4-5	2-9	12	6-18	2.1	0
Control A				2-3	2-5	17	14-20	11	33 per cent
Control B				2-3	2-11	18	12-18	14	20 per cent

John H. D. Megaw

Among the types of the disease observed were the following:—
 (1) The classical five-day type with short paroxysms of fever recurring every four to six days. This was by no means common at intervals varying from one to ten days.
 (2) The irregular recurring type with similar paroxysms recurring at intervals varying from one to ten days.
 (3) The undulant type with regular or irregular recurrences of waves of fever.

(4) Atypical forms with spells of fever lasting several days followed by one or more recurrences at varying intervals.
 (5) Afebrile types in which recurring bouts of pain in various parts of the body replaced the spell of fever. The periodicity of the pains was as irregular as that of the fever.

(6) The vegetative-tonic type in which disturbances of the sympathetic nervous system predominated and caused vasomotor disorders such as symptoms of anæmia, asthma, abdominal pain, urticaria, etc.

(7) A mixed type in which the disease during its course changed from any one to any other of the above types. The most frequent combination was one of the first four types followed by either type 5 or type 6.

The only consistent feature was the pronounced tendency to recurrence though sometimes this was seen at only one stage of the illness and sometimes there was only one recurrence.

Shin bone pains were altogether absent in some cases in others they occurred at only one stage. Similar pains have been observed in typhus fever, malaria, influenza, peritonitis and other diseases so that they are not diagnostic. The Weil-Felix reaction is stated though with some reserve to be negative in trench fever. The diagnosis must often be made by exclusion of such diseases as malaria, relapsing fever, lymphogranuloma, typhus, typhoid, paratyphoid, undulant fever, dengue and influenza.

No treatment was found to have any effect on the course of the disease which always ends in recovery. (1) Has the louse been conclusively proved to be the vector? and (2) Is *Rickettsia* the only causal agent? He argues that *prima facie* a Rickettsia is not likely to cause a disease with a pronounced tendency to recurrence.

John W. D. Meade

REIMER K. Neue Erfahrungen bei Wolhynischem Fieber im Sommer 1942. *New Observations on Trench Fever in the Summer of 1942*. *Deut. med. Woch.* 1943, July 9, 69, No. 27-28, 508-11, 4 figs.

This deal with 95 cases of trench fever seen in the summer of 1942. In several cases in which the incubation period could be determined with accuracy it was at least 13 days. Body lice were found on nearly all the patients, head lice were never seen. Bed bugs could be excluded with reasonable certainty.

The diagnosis is still based on symptoms, no practicable agglutination or precipitation test has been discovered. The rhythmical recurrence of the fever and the pains in the limbs, especially the shin bone pains are the special diagnostic points. Prodromal lassitude and ague pains occurred in 19 of the cases. The onset was with chill in 20 cases, rashes were never observed. Fever with a periodicity of about five days occurred in 30 per cent of the cases. The fever was usually in short

paroxysms but sometimes the spells lasted two to four days. The undulant recurring type of fever was seen in 35 per cent of the cases. The typhoid type was also seen this might be preceded or followed by the recurring types. The number of spells of fever ranged between two and seven. The total duration was 13 to 49 days the average period of hospital treatment was 24 days. Convalescence was slow in about half of the cases there were no deaths.

In 70 per cent of the cases the patients described the pains as shin bone in these the tibia was tender on pressure. The pains came with or before the rise of temperature. The headache was severe in 45 cases eight of the patients complained of giddiness. There was a scanty roseolar rash in 16 cases in two of these there were a few petechiae. The spleen was enlarged in six cases the liver in none. The leucocytes were increased sometimes to 16 000 a temporary leucopenia was seen in two patients. Double inclusion bodies were never seen in the leucocytes though these were always present in the author's cases of typhus. The eosinophile count was normal.

Respiratory tract complications were frequent probably because of the wet weather there was bronchitis in 36 cases and broncho-pneumonia occurred in two of these. There was gastro intestinal catarrh in 39 cases.

John W D Megaw

SKLJA \ Gastrointestinale Symptome bei Febris Wolhynica
[Gastro Intestinal Symptoms in Trench Fever] *Wien klin Woch*
1943 July 2 v 56 No 25/26 412-13 4 fig

In a war hospital for diseases of the bowel 22 (about 4 per cent) of the cases treated since April 1942 had recurring febrile attacks which could only be accounted for as being due to trench fever. The periodicity ranged between three and seven days. Neuritic and rheumatic symptoms were not pronounced the chief features were headache weakness sweating and gastro-intestinal disturbances. There was abdominal pain in most cases but sometimes vomiting and diarrhoea occurred.

Cases of trench fever in which such symptoms predominate are likely to be missed when characteristic febrile paroxysms are absent. Auto-haemotherapy combined with sulphapyridine is the system of treatment recommended by the author.

John W D Megaw

YELLOW FEVER

KIRK R Some Observations on the Study and Control of Yellow Fever in Africa with particular reference to the Anglo Egyptian Sudan
Trans Roy Soc Trop Med & Hyg 1943 Sept v 37 No 2
125-50 2 maps [35 refs]

A valuable summary of the subject which should be read in its entirety by those interested in the study of yellow fever in Africa. The author deals with the distribution and epidemiology of the disease and factors influencing its control and then discusses his own experiences in the Nuba Mountains [see this *Bulletin* 1942 v 39 69] and the possible spread of yellow fever in Africa.

mosquitoes and sandflies it seems likely that this fever to which three new names have already been applied may turn out to be an addition to the dozens of new diseases which have later been found to be dengue or sandfly fever. At any rate it ought to be regarded as belonging to the same group pending fuller information with regard to transmission.]

John H. D. McArthur

SYLLA A. Ueber eine eigentümliche mit zentralnervösen Störungen einhergehende Infektionskrankheit. [A Peculiar Infectious Disease with Disturbances of the Central Nervous System.] *Deutsch med Woch* 1943 July 9 v 69 No 27/28 503-6

During the three months of August September and October 1943 about 30 cases of a special type of fever were seen at an unspecified German military hospital. Evidence of infectiousness consisted in the occurrence of attacks in a nursing sister and four doctors who were attending the patients and in the history of many of the patients who stated that they had been associated with persons suffering from similar attacks. Lice could be excluded in most of the cases but there was no evidence of the mode of transmission. A description is given of 12 of the most severe cases but two of them of long duration resemble trench fever rather than the short fever now described. The general description is of a fever lasting two to three days less often four days with rapid onset and termination by lysis. There was headache referred to the orbital and supraorbital region. This was severe and movement of the eyeballs was often painful. There were pains in the nape of the neck and in the back. No definite skin signs were observed. Occasional symptoms were conjunctival injection and vomiting while diarrhoea and nasal catarrh were exceptionally observed. In several cases there was enlargement of the spleen. Tenderness of the spleen and liver was also observed in some. Occasionally there was enlargement and tenderness of the lymph nodes. Exceptionally there was a fleeting rash. It is stated that there was no recognizable change in the blood picture but it is also said that in half of the case in which a blood count could be made the leucocytes were increased to 12,000-15,000. During convalescence there were lymphocytosis and eosinophilia. Meningismus was of frequent occurrence so was nystagmus. Slight delirium occasionally occurred. The cerebrospinal fluid was usually under slightly increased pressure. It was clear and the cells were 20 to 40. The Pandy reaction was positive. Rapid and complete convalescence was usual but in a few cases headache and weakness persisted for several days exceptionally for some weeks.

Leptospirosis infection is unlikely because of the epidemiological conditions and the absence of pronounced gastrointestinal disturbances in most of the cases. Sandfly fever was regarded as being excluded by the absence of herpes labialis, rash, tenderness of the muscles or special findings in the eye and nasal mucosa.

[The comments made on Russian headache fever apply in most respects to the present article except that high leucocyte counts are quite exceptional in fevers of the dengue sandfly fever group. Apart from the somewhat enigmatic statement about this feature the description suggests a short fever caused by a filter passing virus and transmitted by a free-living insect. Sandfly fever seems to be the most likely diagnosis.]

John H. D. McArthur

PAVLOVSKY E N A most Simple Method for destroying Mosquitoes (*Phlebotomus*) by catching them with a Racket in Buildings of European Type (Contribution to the Prophylaxis of Pendinka and Papitassi Fever) C K (*Doklady*) Acad Sci UKSS 1942 Nov 10 v 37 No 4 150-52 1 fig

The author describes an instrument resembling a racket with which one can catch sandflies (*Phlebotomus*) on walls and in corners. The face of the racket is smeared with some sticky material for instance a vegetable oil or even soapsuds and the edge of the racket is thickened with strips of wood to prevent the sticky surface coming in contact with the wall. The author finds that with this simple instrument he can catch considerable numbers of sandflies in a short time. The insects may be removed with alcohol for subsequent identification.

The author also discusses the importance and the very great difficulties of the control of sandflies and gives a brief account of some Russian work. Much emphasis is placed on the precise location of breeding places. This must depend in its turn on methods for isolating early stages from large quantities of soil or manure.

[The word mosquito in the title refers solely to *Phlebotomus*. The word Pendinka means oriental sore] P A Buxton

PLAGUE

SOKHEY S S & HABBU M K Optimum and Limiting Temperatures for the Growth of the Plague Bacillus in Broth *J Bacteriology* 1943 July v 46 No 1 25-32 [10 refs]

The optimum temperature for the growth of an organism depends on a variety of factors of which the most important are (1) the composition of the medium (2) number of organisms used as the inoculum (3) the time chosen for observation and (4) the criterion used for determining the optimum growth. In the present series of trials a standard broth medium was used. The inoculum on an average contained 3.46 million organisms and crop yield after exactly 36 hours of incubation was used as the criterion of optimum growth. Crop yield was estimated by counting colonies developing on a blood agar plate seeded with 0.05 ml of the growth in 1-1,000,000 dilution. The broth media of pH 7.2 were used in 10 ml quantities and the test tubes were of 1.7 cm internal diameter. Statistical tests of significance were applied to the data obtained and it was found that the optimum growth temperature of the plague bacillus was 27 to 28°C. The growth at this temperature was about five times the growth at 37°C. The limiting growth temperatures were -2°C and 45°C.

H F Harvey

SOKHEY S S & HABBU M K Optimum and Limiting Hydrogen Ion Concentrations for the Growth of the Plague Bacillus in Broth *J Bacteriology* 1943 July v 46 No 1 33-7

Plague bacilli have been reported to grow best in slightly acid media. The present trials have made use of more accurate methods with unbuffered broth media the pH of which did not change during

a 36-hour period of incubation. Buffering of the medium was found to cause a marked reduction of the growth. A range of pH 6.2 to 8.0 was used for the main experimentation but separate tests were made with pH values extending as low as 4.8 and as high as 9.8. In this latter case because of the poorer growth the period of incubation was increased to 48 hours. It was found that limiting pH values for the growth of the plague bacillus were 5.0 and 9.6 at the optimum temperature of 28°C. Maximum growth was obtained between pH 7.2 and 7.6 and fairly good growth between pH 6.6 and 8.0.

W. F. Harvey

CHOLERA

WENDEROTH H. Ueberempfindlichkeitsreaktionen nach Cholera schutzimpfung. [Hypersensitivity to Cholera Inoculation] *Deut med Woch* 1943 June 11 v 69 No 23/4 445-7

Local and general reactions after cholera inoculation are well known: redness, swelling, pain, enlargement of regional lymph nodes, moderate fever, headache, loss of appetite and temporary diarrhoea. These are of little consequence but occasionally more alarming symptoms make their appearance. In the causation of these, contamination and affections such as erysipelas, scarlet fever, arsenical rashes, etc. have to be excluded. Major incidents of this description are scarlatiniform varicella like rashes with rigors and high fever. Many thousands of inoculations for cholera were given at the hospital where the three cases described occurred. The first of these cases was in a well nourished man aged 42 who had had typhoid inoculation without reaction. Three days after the first cholera inoculation (0.5 cc) the patient suffered from intense itching of the skin, slight shivering and a feeling of swelling in the mouth. The skin began to redden and the patient had rigors; any pressure on the skin caused great pain. The temperature was 39.7°C (103.5°F) and the skin became bluish red all over including the scalp. Cutaneous haemorrhage was apparent in places; the face was swollen and especially the eyelids. The tongue was much furled; the throat showed mucus but the tonsils were not affected; all palpable lymph nodes were enlarged. No heart or lung conditions were detected and the abdomen was soft. The urine contained albumen but no sugar; blood haemoglobin was 80 per cent and leucocytes 16,400 but there was at first only 2 per cent eosinophilia. The temperature fell to normal in three days and the rash disappeared gradually but the eosinophils rose to 8 per cent. The patient was convalescent in two weeks. A sensitivity reaction was applied by means of a small intracutaneous injection of 1-1,000 cholera vaccine with appropriate controls. The reaction to the cholera was a positive 2 cm redness in about six hours. Two other cases are described and all three are regarded as an individual primary hypersensitivity to the bacterial protein.

W. F. Harvey

BACILLARY DYSENTERY

WILF G Polyneuritiden nach chronischer Enterocolitis insbesondere nach Ruhr [Polyneuritis after Chronic Enterocolitis particularly after Dysentery] *Deut med Woch* 1943 June 11 v 69 No 23/24 4434

During the battles on the Eastern (Russian) Front numerous examples of polyneuritis were observed which resembled so called idiopathic inflammatory polyneuritis. These exhibited predominantly motor paralyses and sensory disturbances. Most of the patients gave a previous history of specific infection with Flexner or Shiga Kruse bacilli. All degrees of nerve involvement have been observed. Since the paralysis affected chiefly the proximal muscles it was evident that the condition was a proximal nerve paresis and so differed from the well known type of degenerative toxic polyneuritis with distal pareses. Subacute mild forms tended to predominate from July to September 1942 during the maximum incidence of dysenteric infection.

At first the true neuritic nature of these complaints was overlooked and the symptoms were attributed to neurosis. Patients complained mostly of difficulty in walking squatting or stretching out their arms. More detailed examination revealed motor weakness of proximal muscles especially those of the shoulder girdle and of the pelvis with some obvious muscle atrophy. In the early stages the ilio psoas quadriceps glutei deltoid serratus supra and infraspinati and abdominal muscles were affected. Pain and increased sensibility on pressure were noted so that the clinical picture resembled that of progressive muscular pseudodystrophy or what the French call the pseudomyopathic form of polyneuritis.

In the early stages the tendon reflexes were increased but were subsequently diminished. The electric excitability of the muscles was usually also increased. The relationship of these complications to dysenteric toxins was shown by the frequent coexistence of conjunctivitis and exudative arthritis and sometimes of non specific urethritis.

In October and November 1942 severe chronic polyneuritis cropped up. Usually these cases exhibited signs and symptoms of chronic dysentery with mucoid or purulent stools and ulceration of the sigmoid colon as visualized by sigmoidoscopy. In a few cases cultures of Shiga Kruse bacilli were obtained by rectal swabs. Usually polyneuritis supervened when the stools became formed. Proximal muscle groups were affected mainly those of the back and neck. In some cases the facial nerve was implicated. Degenerative electrical reactions were noted in two cases in the deltoid and quadriceps. Sensory disturbances of the distal type supervened so that superficial sensory changes in the distal extremities ataxia and deep sensory disturbances were prominent.

The cerebrospinal fluid in severe forms showed marked changes. The protein content was increased to $\frac{1}{2}$ —1 part per thousand and usually there was a mild pleocytosis.

The most severe polyneuritis was associated with dysenteric polyarthritis. Prognosis depended on the healing of dysenteric lesions and improvement in general condition but recovery was usually remarkably rapid. In one case fatal pneumonia supervened.

The supposition that these neuritic phenomena were in any way due to an independent virus infection received no support.

P Manson Bahr

AMOEBIASIS

Hood Marion The Incidence of Amebiasis observed at a Chicago Hospital over a Twelve Year Period *Amer J Trop Med* 1943 May 13 No 3 327-32

During the 12 year period 1930 to 1942 1999 patients and employees at the Research and Educational Hospital Chicago were examined by various methods for intestinal protozoal infections. Most of them had some form of gastro-intestinal disorder. Over the whole period there was an average of 7.3 per cent harbouring *Entamoeba histolytica*. Routine examination of 103 normal individuals gave an infection rate of 0.97 per cent. While an examination of 243 patients with gastro-intestinal symptoms showed an infection rate of 20.5 per cent. The years 1933 and 1934 are those in which the Chicago amoebic epidemic occurred and about this time the examinations described in this paper showed an increased incidence of amoebic infection. Some data of the incidence of *E. histolytica* and other intestinal protozoa encountered in patients and food handlers are also given. C M Nelson

Ivanhoe Grace L Studies on the Transmission of Amebiasis in a Children's Home in New Orleans *Amer J Trop Med* 1943 July 13 No 4 401-19 3 figs [31 ref.]

In a children's home in which 130 children mostly orphans up to 12 years of age were cared for examination carried out yearly from 1931 to 1941 revealed a very high rate of intestinal protozoal infections. In 1939 the *Entamoeba histolytica* rate was 84 per cent. In 1941 the older group of children aged four to six years gave the following infection rates:—*E. histolytica* 56.4 *E. coli* 73.0 *Endolimax nana* 70.0 *Giardia intestinalis* 67.5 *Chilomastix mesnili* 18.7 *Iodamoeba butschlii* 5.4 *Trichomonas hominis* 10.8 *E. terribilis* 24.3 *Trichuris trichiura* 63.0. These results appeared to indicate the suitability of the home for a study of the method of spread of the infections about which there was little precise information. Thus in the case of *E. histolytica* the only sites in which cysts had been found apart from the intestinal content of warm blooded hosts were under the finger nails of human beings and on the surface or in the intestinal contents of house flies. Observations on outbreaks of amoebic dysentery had seemed to indicate that contaminated water was the chief source of infection for cysts of the parasitic amoebae are quickly killed by drying. With this information available it was decided to make a careful study of the home from the point of view of the distribution of cysts and their transference from one child to another.

The home was apparently very clean with daily dusting and a thorough cleaning once a month. The children were well looked after the wearing apparel and bed clothes being frequently changed and laundered. There was a good provision of toys including a sandbox and two wading pools. The investigation consisted in the collection by brushing and sucking of dust surface washings from tables toys seats and underclothing water from the bathing pool etc. This material was subjected to centrifugation in a Foerst centrifuge capable of handling a continuous flow of water. The deposit was finally concentrated by floatation with zinc sulphate solution.

The general result was the discovery of cysts or eggs from the hands and soiled underclothing laundry chute sand in the playbox pool contents tops of boxes chairs seats of toys bed frames laundered underwear toys bookshelves swings and slides floors and stairways. There would seem to be little doubt that the cysts and eggs in these localities had originated from the children and that the method of transmission in the home was by direct contact of one child with another aided by the general pollution of the environment. This conclusion is supported by the results of the examination of the daily routine of the children which affords an explanation of how the organisms were able to reach the places where they were found.

Having demonstrated the environmental contamination efforts were made to eradicate it by thorough cleaning and mass treatment of the children and attendants. The whole home and contents were subjected to applications of live steam. Four weeks after these procedures the examination of a single specimen from each child by the direct film method and by zinc sulphate centrifugal flotation failed to reveal a single case of *L. histolytica* infection. C M Weyon

ROYO MONTAÑES M. Disenteria amibiana en el niño lactante [*Amoebic Dysentery in Infants*] *Med Colonial* Madrid 1943 Oct 1 v 2 No 4 280-300

After giving extracts from reports of many writers who have remarked on the rarity of amoebic dysentery in infants at the breast the author gives notes of 11 cases in children ranging in age from 4 to 12 months. Of these one was 4 months old three were 8 months one of 9 one of 10 two of 11 and three of 12 months. It is only fair however to add that all had been artificially fed two of them from birth two after 2 months one after 3 months two after 4 and two after 5 months. Two others were fed partly on the breast and partly artificially from birth. All reacted to the usual treatment.

H Harold Scott

MORSE Esther M & SEATON S P. Amoebic Infection of the Vagina and Uterus. *Amer J Trop Med* 1943 May v 23 No 3 325-6

Three cases of infection of the uterus and vagina with *Entamoeba histolytica* leading to discharge of blood and muco purulent material are described from Hainan Island China where amoebic dysentery is common. One of the patients had an associated intestinal amoebic infection. Treatment consisted of douches combined with hypodermic injections of emetine and quinine by the mouth for fever which may have been due to malaria. C M Weyon

VON BRAND T REES C W JACOBS L & REARDON Lucy V. Studies on Reducing Substances and Gas Formation in Cultures of *Entamoeba histolytica* and a Single Species of Symbiotic Bacteria. *Amer J Hyg* 1943 May v 37 No 3 310-19 3 figs [12 refs]

The authors have shown that the egg emulsion forming the slants of the Locke egg serum medium employed for the cultivation of *Entamoeba histolytica* contains from 276 to 312 milligrams per cent of reducing substances. When the slants are covered by the liquid part of the medium diffusion of these reducing substances from the egg

emulsion takes place over a week with a final concentration in the liquid of 40 milligrams per cent. If glucose up to 300 milligrams per cent is added to the liquid overlay diffusion still takes place but is less rapid. In the medium with or without sugar *Entamoeba histolytica* with a single bacterium or the bacterium alone was grown. In all cases the reducing substances were almost completely utilized in 24 to 48 hours. There was no detectable difference in this respect between the cultures of the amoebae with the bacterium and those of the bacterium alone. In both types of culture gas the prominent constituent of which was hydrogen as produced in equal amount an indication of an anaerobic metabolism.

C. M. Wenyon

RELAPSING FEVER AND OTHER SPIROCHAETOSIS

MAZZOTTI L. Transmission Experiments with *Spirochaeta turicatae* and *S. tene uelensis* with Four Species of *Ornithodoros*. Amer J Hyg 1943 Sept 38 No 2 203-6

The results obtained from a study of the experimental transmission of *Spirochaeta turicatae* and *S. tene uelensis* by means of *Ornithodoros* *amblyus*, *O. furcosus*, *O. parkeri* and *O. hermsi*.

The two strains of spirochaetes were obtained from naturally infected ticks *O. tene uelensis* and *O. turicatae* collected in Giron Colombia and in Aguascalientes Mexico. Mice were infected with these strains and when numerous spirochaetes were present in the blood the ticks being studied were fed on these heavily infected mice and subsequently after varying intervals fed on normal mice.

Ornithodoros amblyus and *O. furcosus* were found incapable of transmitting *S. turicatae* or *S. tene uelensis* by biting nor can *S. tene uelensis* be transmitted by *O. parkeri* or *O. hermsi*. The inoculation of triturated ticks into mice showed that *Spirochaeta turicatae* and *S. tene uelensis* survive only a few days in *O. amblyus* but at least 74 days in *O. furcosus*. *S. tene uelensis* can survive in *O. hermsi* and *O. parkeri* for some time but less than four months. Similarly *S. turicatae* survives in *O. hermsi* for a similar period but in *O. parkeri* for at least 304 days.

E. H. Idle

LESH J. I. & CANNON D. A. A Case of Leptospirosis in Southern Nigeria. Trans Roy Soc Trop Med & Hyg 1943 Sept 37 No 2 89-94 1 chart [17 ref.]

The description of a case of leptospirosis in Southern Nigeria with clinical symptoms resembling those of yellow fever. The case was diagnosed by the presence in the blood of a lutinus to *L. ictero haemorrhagiae* (Wynberg strain) with a titre of 1:1000 on the 30th day of illness which had dropped to 1:300 by the 39th day.

The patient had evidently acquired the infection near Ife and it is suggested that it occurred through bathing in a small river in the bush and that infected rats may be widely distributed through Southern Nigeria.

Leptospirosis had not previously been recorded from Nigeria although jaundice is a fairly common condition. 216 cases having been treated

at the various Government hospitals during 1936 to 1938 inclusive. Of these cases 152 were entered as cholecystitis, 40 as yellow fever and the remaining 1970 as catarrhal jaundice. E Hindle

LEPROSY

PARGO CASTELLO V & TIANI F R The Histamine Test with particular reference to the Diagnosis of Leprosy *Arch Dermat & Syph* 1943 June v 47 No 6 526-9

The normal reaction of the skin to the histamine test depends on the integrity of sensory fibres of the peripheral nerves and it is therefore negative when applied to anaesthetic patches of leprosy. As carried out by Sir Thomas LEWIS the intradermal injection of a 1 in 1000 solution of histamine phosphate is followed by the immediate appearance of a purpuric spot at the site of injection followed by an erythematous areola several centimetres in diameter and by the formation of a weal in the centre of the erythematous area. The whole reaction persists for 20 to 45 minutes. On an anaesthetic skin the weal duly appears but the erythema is always absent. The test dose is 0.1 cc of the histamine phosphate solution injected on the border between the normal and affected skin. The erythema stops abruptly at the margin of the anaesthetic area. In sensory paralysis due to spinal cord lesions and in syringomyelia which has at times been confused with leprosy the reaction is normal. The authors found the test to be of diagnostic value in neural leprosy cases. Their method is a slight modification of that of RODRIGUEZ and PLANTILLA [this *Bulletin* 1932 v 29 268] they make a slight intradermal prick with a hypodermic needle through three drops of a 1/1000 solution of histamine phosphate placed on the skin, one drop being on the affected skin, another on the border between the normal and the affected skin and the third on the normal skin. The drops are then wiped off. The sequence of events differs from that described by LEWIS: after 25-45 seconds the normal skin shows an erythematous area spreading to a diameter of 3-5 cm. after 60-100 seconds a weal appears at the needle prick and after about three minutes a haemorrhagic spot appears at the same place. The authors found this method better than intradermal injection or scarification. They say also that the temperature of the room must be above 75 F to obtain well defined erythema in the normal skin. [Descriptions of the effects produced vary somewhat. Other references are given in this *Bulletin* 1940 v 37 337.] L Rogers

GARZON R & PITT L A Neuritis leprosa tuberculoide a forma de abscesos caseosos multiples (3 observaciones) [Multiple Caseating Abscesses of the Nerves in Tuberculoid Leprosy] *Rev Argentina de Dermatosisifilologia* 1943 June v 27 No 2 247-57 4 figs [10 refs]

The local lesions in the condition here described are fundamentally leprous neuro-granulomata and the changes are on the same lines as those of tuberculosis—giant cells, epithelioid cells and lymphocytes, caseation and cold abscesses. Reports on the presence or rather the

finding of bacilli vary. J. LOWE found them in half his cases [this Bulletin 1935 v. 3, 336]. SCHULMAN in one out of three [this Bulletin 1936 v. 33, 605]. DE SOUSA CAMPOS in none of fifteen cases and the present authors did not find them in any of their three patients. Pathologically the necrosis and liquefaction take place in the nerve sheath and the pressure accounts for the pain. The cutaneous branches of the median, radial, auricular, external popliteal and other nerves are usually involved rather than the main trunks. Histologically three zones may be seen: a central caseous mass outside the epithelioid cell, lymphocyte and a few plasmocytes and outside that a zone of monocyctic infiltration with dilated and congested capillaries. Treatment: surgical. *H. Harold Scott*

BAISONBRIO G. Beneficio del tratamiento chaulmoogrico intensivo en la lepra lepromatosa. [Good Results from Intensive Treatment of Leprosy with Chaulmoogra.] *Rev. Argentina de Dermatosisfilosofia* 1943 June v. 27 No. 2 238-40

The benefits of intensive treatment are seen in those who are in the early lepromatous or tuberculoid types. Of patients seen at the Buenos Aires centre lepers in the highly contagious stages are sent to the National Health Department for segregation; those in the tuberculoid or incipient lepromatous stages are treated at the Centre. Perhaps it is by reason of their being in an early stage that such good results are obtained. The intensive treatment consists in giving large doses of the ethyl esters of chaulmoogra 30 cc weekly for 7-10 months. The author gives notes of three cases—

1. An Italian woman of 31 years with maculae on chest and limbs, thickened areas of the skin of hands and face, anaesthetic patches. Mitsuda's reaction negative; bacilli present. She was started with 15 cc of the esters twice a week but her tolerance was poor and the dose had to be reduced to 10 cc and later to 5 cc but between September 1940 and December 1942 she received 1954 cc. At the end of this time the lesion had disappeared; the thickenings of the skin were no longer discernible but the anaesthetic patches remained. Examination for bacilli in 24 places was negative.

2. An Argentine woman of 56 years with symptoms like those of the first. She was given 15 cc twice a week for 15 weeks (=450 cc) three times in the year (i.e. 1350 cc a year). The lepromata cleared up in two years. She had had irregular treatment for the preceding nine years without obvious benefit.

3. A woman of 17 years had been under various doctors till June 1941 when the intensive treatment was started. She was however intolerant of doses above 10 cc twice weekly and by the end of the year she had had 440 cc and in the following year 510 cc. Thereafter the intolerance increased and she could not take even 25 cc and she was given a mixture of chaulmoogra and cod liver oil prepared at the National Department of Health. The lesions cleared and bacilli were no longer seen. *H. Harold Scott*

FRANCIS J. Infection of Laboratory Animals with Johnes Disease and Leprosy. *Nature* 1943 Aug. 28 250-51 [17 ref.]

Johnes disease is a progressive diarrhoea of bovines contracted at an early age and due to an acid fast bacillus which in some respects

resembles that of leprosy as it is very difficult to cultivate and in that attempts to infect laboratory animals have not generally been successful. The author reports that he has succeeded in infecting very young mice (2 weeks old) with *Mycobacterium johnsonii*. Experiments with the human leprosy bacillus have yielded only occasional successes in the case of the hamster and with mice and rats. He quotes from ROGERS and MUIR to show the much greater susceptibility of young children to human leprosy and suggests that animal experiments with the causative organism should be repeated using very young animals.

L. Rogers

HELMINTHIASIS

HOMIRSCH H. Über die Verbreitung von menschlichen Eingeweidewürmern in verschiedenen europäischen Ländern [The Distribution of Human Intestinal Worm Infections in Europe] *Zent f Bakt I Abt Orig* 1943 June 15 v 150 No 4 209-15 [39 refs]

During the last few years 96 044 workers from nearly all the countries of Europe were examined for infection with intestinal worms. They were men aged 18-48 years and came from Russia, Poland, Croatia, Italy, Belgium, France, Holland, Denmark and Bohemia. The following worms were found: *Taenia solium*, *Taenia saginata*, *Iscauris lumbricoides*, *Enterobius vermicularis*, *Strongyloides stercoralis*, *Ancylostoma duodenale* and *Trichuris trichiura*.

Two fresh preparations of faeces were examined microscopically for eggs and a search for ancylostome larvae was made by Looss's method of culture with animal charcoal. The highest infection rates were among the Croats (35.38 per cent) and Italians (28.66 per cent). Infections with *Ascaris* and *Trichuris* were by far the commonest while hookworm infection was very slight.

The author gives a summary of previous investigations in Germany and other European countries and does not claim that the present examination has any statistical value for the following reasons: the use of concentration methods would probably have given higher figures; the incidence of infection varies greatly in different parts of a country and it may vary in successive years and in different seasons.

J. I. Corson

GELFAND M & OSBURN H S. Katayama in Southern Rhodesia. *Clin Proc Cape Town* 1943 July v 2 No 7 169-73.

When bilharziasis is localized to the bowel or bladder it is not usually difficult to diagnose provided that specimens are carefully and regularly examined. Before the disease is localized diagnosis is practically impossible unless the syndrome called Katayama disease occurs. Katayama usually begins about 4-6 weeks after exposure to infested water; its important features are irregular or remittent fever lasting 3-8 weeks; urticaria on any part of the body with severe itching; eosinophilia which begins soon after the fever and soon reaches a maximum falling then to a lower figure which persists a long time; and 10-12 weeks after exposure to infestation the appearance of eggs in the faeces and urine. The complement fixation test

would be a great help but it is not done in Southern Rhodesia. Katayama is well recognized in Japan and Egypt. Gelfand [this Bulletin 1943 v 40 398] reported the first case in Rhodesia and since then he has seen two more—all three occurred in Europeans. The native probably also suffers from it but does not see a doctor until he is very ill and the urticaria is not so easily seen on a dark skin. The European cases were diagnosed as urticaria or a typhoid like fever. Large numbers of people are probably infested with Bilharzia in Southern Rhodesia and Katayama is probably often overlooked. It is especially important to recognize it in cases of intestinal bilharziasis.

A fourth case is here reported in a European boy aged 11. Four weeks after exposure to infested water the boy felt ill and had a rash over his legs for two days. A few weeks later he was still unwell with frontal headache, loss of appetite and slight cough. The spleen and liver were not palpable and there were no eggs of Bilharzia in the faeces or urine. The boy stayed in hospital for 11 days; his temperature varying between 99 and 101.4 F throughout. On the third day he had severe pain in the left elbow which disappeared the next day. On admission his haemoglobin percentage was 76 and there were 56 per cent of eosinophils. No malaria parasites were found. Seven days later a Widal test was negative as was also an agglutination test for *Br abortus*. The eosinophils were then 41 per cent. Fifteen days later the eosinophils were 52 per cent and stool and urine examinations were negative. Some three months after this the haemoglobin was 80 per cent and the eosinophils 12 per cent—a little later these were 78 per cent and 18 per cent respectively.

No diagnosis was made but the possibility of Katayama was considered likely. About eight weeks after discharge from hospital eggs of *Schistosoma mansoni* and *S. Faeria obium* were found in the stools. After a course of antimony the boy made an uninterrupted recovery.

G. Lapeere

GAELTGEN, W. Serodiagnostische Untersuchungen ueber Taenia infektionen unter besonderer Berücksichtigung der Zystizerkenkrankheit. Serodiagnostic Investigations on Taenia Infestations with special reference to Cysticercosis. Arch f Hyg u Bakt 1943 v 129 No 1 6 133-54 26 refs

Only a brief summary of this long and complex paper can be given.

The author begins with a brief account of work on the value of the complement fixation reaction for the diagnosis of intestinal infestations with Taenia and Diphyllbothrium and of the much better results obtained by serological studies in phases of tape worm infestation (Echinococcus and Cysticercus) in which the parasites enter the tissues and body fluids. Like other authors quoted Gaeltgens failed to find a serological reaction that is reliable for the diagnosis of tapeworm infestation of the intestine. Serological study in echinococcosis is however a valuable aid to diagnosis if the antigen is carefully adjusted and the controls are satisfactory. In 1926 the author diagnosed serologically 94 out of almost 600 cases in which echinococcosis was either suspected or diagnosed by other methods.

Less known of the serological diagnosis of cysticercosis (*Cysticercus cellulosae* of *Taenia solium*). A history of earlier work on the serological study of it is given. The author describes his method of making antigen by grinding up and extracting in carbolyzed normal saline cysticerci

obtained from pig muscle. He concludes that important diagnostic aid is obtained from the examination of the blood and cerebrospinal fluid of suspected cases by complement fixation and precipitation reactions. He describes his use of a flocculation test based on the technique of Meinicke. These tests showed adequate specificity if they were carefully done. The complications introduced by sera of syphilitic and pregnant patients and other difficulties are discussed. Sera of patients with cysticercosis which give a strongly positive complement fixation reaction react also with *Echinococcus* antigen and *vice versa*. The Meinicke flocculation reaction mentioned above is less likely to give such cross reactions. Differential diagnosis between echinococcosis and cysticercosis is however possible by the kaolin adsorption technique. The author describes his experiments with this. A case is described of a young woman from whose frontal lobe a histologically diagnosed *Cysticercus* was removed. X ray examination and a positive skin test with *Echinococcus* fluid indicated infestation also with *Echinococcus*. Interpretation of the serological tests in this case was difficult because of lability of the serum. It demonstrated the limits of serological diagnosis but on the whole it confirmed the clinical diagnosis and after death *Echinococcus* was found in the lungs, liver and heart.

G Lapage

D'ARBEU A L & ROGERS L. Bilateral Pulmonary Hydatid Cysts. *Brit J Surgery* 1943 Oct v 31 No 122 153-5 3 figs

CHIFFLET A & PEYRALLO R. 60 observaciones de equinococosis pulmonar [Sixty Cases of Pulmonary Hydatid Cysts]. *Arch Uruguayas de Med Ciruj y Especialidades* 1942 Dec v 21 No 6 668-77

LARGHERO BARZ P & PURRIEL P. Equinococosis plural [Hydatid of the Pleura]. *Arch Uruguayas de Med Ciruj y Especialidades* 1943 Jan v 22 No 1 56-66 7 figs

CHRISTIE J R [Editor] *et al*. An Introduction to Nematology. Section II Part II Chapters IV-XI pp 243-372 figs 165-202 [Numerous refs] 1941 M B Chitwood PO Box 425 Babylon NY USA

This part of the work on nematology which is being published in Sections and Parts contains much that is of direct medical interest. In Chapter VI Asa C CHANDLER J E ALICATA and M B CHITWOOD describe the life history of the parasitic nematodes of vertebrates in Chapter VIII W W COTT ELOISE B CRAM and D L AUGUSTINE discuss the epidemiology and control of human parasitic nematodes and in Chapter IX anthelmintics are fully dealt with by W H WRIGHT and P D HARWOOD. There are numerous excellent drawings and full bibliographies.

J F Corson

KRAUSE G R & CRILLY J A. Roentgenologic Changes in Small Intestine in Presence of Hookworm. *Amer J Roentgenol & Rad Therapy* 1943 June v 49 719 [Summary taken from J Amer Med Ass 1943 Sept 25 v 123 No 4 235-6]

Krause and Crilly show that infection with the hookworm *Necator americanus* causes alterations in the small intestine which they designate as the deficiency pattern. If this pattern is seen the

stool should always be examined for the ova of intestinal parasites. The author studied the small intestine of 97 young white men who were known to harbor *Necator americanus* and who had no other disease known to cause the deficiency pattern. Of the 44 patients with clinically significant hookworm disease 40 showed the deficiency abnormalities which were moderately or far advanced in 36. Of the 53 patients with asymptomatic incidental hookworm infection 33 had a normal small intestine 16 showed minimal variations from the normal and only four had severe alterations of the normal pattern. After anthelmintic therapy alone there was a return to normal but not to the normal pattern in those with severe involvement. Minimal alterations disappeared entirely in some instances. A significant correlation exists between the presence and extent of the physiologic alterations seen on the roentgenograms, the clinical findings and the severity of the infection with the hookworm.

McNABARA, K. N. Ruptured Liver Abscess and Round Worms With a Note on the Use of Spinal Anaesthesia in Infants New Zealand Med J 1943 Aug 49 No 230 171-3

The author reports on the case of a half-caste Maori boy aged 7 who had been quite well until four days before his admission to hospital. During these four days he had vomited intermittently and the abdomen had been tender for three days. The temperature was 101 F, the pulse 130, the abdomen distended and rigid with generalized tenderness. Respirations were 40 per minute, shallow and grunting. Peritonitis from a ruptured appendix was diagnosed. Operation under spinal anaesthesia revealed a normal appendix, the abdomen was full of thick turbid fluid containing flakes of purulent cheesy exudate and the bowel coils were matted together with thin fibrino-purulent exudate on their serous surfaces. In one loop of the ileum 10 coiled Ascarids were felt. Autopsy revealed a large suppurative area three inches in diameter with an inflammatory zone around it at the periphery of the right lobe of the liver hump under the diaphragm. Irritation by this possibly caused the rapid grunting respirations. On section the lesion showed a honeycombed appearance, no adult worms were found in the liver. *Staphylococcus aureus* was cultivated from the peritoneal fluid. There was a marked eosinophilic reaction in the liver. The author suggests that a clump of Ascarid larvae had become stranded in the liver and had set up an infection there.

G. Lapa

LONGINOV, A. N. [An Experiment in the Treatment of Infestation with *Ascaris lumbricoides* with Hexyl Resorcin] Sovietskaya Medicina 1943 No 4 27-8

Remarking that santonin is not only contraindicated by certain conditions (gastroenteritis, acute and chronic infections, kidney troubles) but is also not always effective against Ascaris, the author states that tsetse flies are ineffective in patients who are passing unfertilized eggs of Ascaris. Longinov has noted that unfertilized eggs of *Ascaris lumbricoides* predominate over fertilized eggs in the autumn while by January the number of each is about equal. There is thus some foundation for pushing the dose of santonin in the summer. Additional reasons for this are that summer diet is unfavourable to

the Ascarids and that their resistance varies at different times of their life. Recalling the fact that some insects die soon after copulation the author suggests that this may explain the better effect of santonin against fertilized Ascarids [Presumably he means that Ascarids which have copulated are less resistant and will soon die in any event.] He suggests the same reason for the fact that he found that hexylresorcinol like santonin is less effective in the autumn.

Hexylresorcinol was tried during the months May to September. The patients had a saline purge in the evening and no food after supper until 8-10 next morning. Hexylresorcinol was then given in capsules. A second saline purge followed 12 hours later or next morning. Most of the patients were adults who were passing unfertilized eggs of Ascaris from some of them santonin had failed to expel the worms.

Positive results were obtained in 65 per cent of 93 cases. This is a lower percentage than that obtained by some other workers (BRAUN 75 per cent after a single dose and 95 per cent after repeated doses [no reference given]). Longinov suggests that his results were not so good because he was treating patients passing unfertilized eggs. In 20 per cent of patients pains in the throat and intestine and a bitter taste in the mouth were observed but some patients disobeyed the instructions breaking open the capsules and taking the drug in water. Hexylresorcinol expelled Ascarids from patients from whom santonin had failed to expel them. It can be used for such cases but it cannot replace santonin being too expensive and too difficult to obtain.

No references are given but a few papers on the use of santonin and hexylresorcinol are mentioned and quoted. *G Lapage*

YOUNG May R. Threadworms in Children in England [Summary.] *Proc Roy Soc Med* 1942 Aug v 35 No 10 684-5 (Sect for Study of Disease in Children 28-9)

The author has found 42 per cent of 119 children in St Bartholomew's Hospital positive for Enterobius on examination of three cellophane swabs from the anus for each child and 55 per cent of 40 positive on examination of two such swabs in residents of a London nursery school. In the first group only 5 per cent showed ova in the stools.

Charles Wilcocks

DONALDSON A W. The Prevalence of Pinworm Infection in an Ohio Institution for Children [Research Notes.] *J Parasitology* 1943 Aug v 29 No 4 298-9

An examination for Enterobius infection was made of 269 children aged 3-18 years who lived in an institution in Ohio. The NIH swab method was used. No child was examined more than twice and only 77 of the 192 who gave negative results at the first examination were re-examined. Positive results were obtained in 72 (46 per cent) of the 158 boys and in 34 (31 per cent) of the 111 girls.

The living conditions in the institution were good—excellent sanitary facilities, separate beds and different age groups in separate dormitories, daily bathing however was not required and the children usually wore their clothing for several days.

The percentage infection (39) is considerably lower than the average percentage infection (63) for persons living in institutions in six localities in North America summarized by CRAW [An Introduction to

Nematology edited by J R CHRISTIE 1941 Sect II Part II 322-4
see also this *Bulletin* 1943 v 40 6181 The present report is submitted as an addition to the existing data J F Corson

KATHE J & PETERS F Ueber die Trichinose und ihren Nachweis unter besonderer Berücksichtigung der immunologischen Verfahren [On Trichiniasis and its Diagnosis with special reference to Immunobiological Methods] *Ztschr f Immunopath u Exper Ther* p 1943 4p 0 103 No 1 1-25 4 figs [51 ref]

This paper served in *Bullet of Hygiene* 1943 18 p 918

DEFICIENCY DISEASES

BROCK J I Malnutrition in South Africa *South Africa Med J* 1943 July 24 v 17 No 14 219-22 [10 refs]

Starvation is not common in South Africa but still occurs seasonally among non Europeans in some districts. Vitamin or mineral deficiency diseases are very common in non Europeans and states of subnutrition (in which efficiency and stamina can be improved by the provision of more protective foods) were found in 40.3 per cent of over 8000 European schoolboys during one survey.

The author discusses these questions and the diets necessary for health in relation to South African conditions. He states the problem and suggests the remedies some of which are as follows.—The present production of protective foods is quite inadequate. Milk production represents no more than one tenth of a pint per person daily. The production of potatoes and vegetables is sufficient for only 2.1 and 3 million persons of a population of 10 millions. The solution is to increase the agricultural production and purchasing power *pari passu* but until these can be raised to an adequate level schemes of food subsidy must be applied such as (to the consumer) free milk and cheese in schools or cheap butter. The fertility of the soil must be restored and maintained and the fishing industry exploited.

It is not the responsibility of the medical profession to decide what are the best remedies for malnutrition but it is our responsibility to insist that a remedy be found. Those who have studied the problem know that there is a remedy which could rapidly be applied if public ignorance and indifference could be stimulated into a demand for action.

Charles Wilcocks

FEHLIS India The Differential Diagnosis of Infantile Beriberi *Trans Roy Soc Trop Med & Hyg* 1943 Sept v 37 No 2 111-23 17 refs]

The so-called *infantile beriberi* differs from adult beriberi in its sudden onset and acute and malignant course like that of some toxic condition the toxin being in the author's view methyl glyoxal an intermediate metabolite of carbohydrates in the absence of vitamin B₁. Methyl glyoxal is found in the blood cerebrospinal fluid urine and milk of avitaminotic subjects. She presents the following scheme or classification of infantile beriberi according to the symptoms presented and the course of the disease.

INITIAL INFANTILE BERIBERI

Vomiting restlessness pallor flabbiness anorexia insomnia meteorism

SUBACUTE INFANTILE BERIBERI

Vomiting puffiness oliguria meteorism
abdominal pain dysphagia aphonia
tonic convulsions diarrhoea

ACUTE INFANTILE BERIBERI

Cyanosis dyspnoea running pulse

CHRONIC INFANTILE BERIBERI

Vomiting loss of weight retarded
growth inanition anemia head
retraction aphonia oliguria
oedema constipation meteorism

Dr Fehily then discusses the differential diagnosis and states that in general infantile beriberi should be suspected in all cases of persistent vomiting in breast fed infants who show no physical signs of disease. Bronchitis slight fever and aphonia are other symptoms the aphonia being due to oedema in the early stage to paralysis in the chronic stage and to both these in the subacute. In the subacute stage diagnosis must be made from dyspepsia cerebrospinal fever (there may be rigidity of neck and extremities strabismus and fever but the c s f is clear and under normal pressure) nephritis (from puffiness of hands and feet but there is no albuminuria as a rule and reflexes are diminished and improvement follows administration of vitamin B₁) peritonitis (owing to the vomiting abdominal pain tenderness and meteorism). Acute infantile beriberi may have to be differentiated from cardiac disease laryngeal diphtheria laryngismus stridulus and the chronic form from tuberculosis and syphilis.

A point to be specially noted is that infantile beriberi is not synonymous with beriberi in infants as infantile beriberi is a separate entity [whatever that may mean] caused by ingestion of milk of B₁ vitaminotic women. The mothers are living on the verge as it were of avitaminosis and the additional strain of pregnancy and lactation turns the scale.

H Harold Scott

FERGUSON J W Pellagra following Gastro Enterostomy Glasgow
Med J 1943 Oct 12 No 4 119-22

HAEMATOLOGY

NAPIER L E & SEN GUPTA P C Studies in Haemolysis With
Histological Notes' by N V BHADURI & 'Statistical Analysis'
by C C SEKAR Indian J Med Res 1943 May 31 No 1
75-101 4 graphs 4 figs (2 folding) & 2 pls [12 refs]

Haemolytic sera were produced by repeated injections into rabbits of washed monkey cells and were used to study the effects of haemolysin on red cells *in vitro* after intravenous injection into monkeys

After a single large dose of haemolysin there is an acute haemolytic crisis starting almost immediately after the injection and indicated by severe prostration, haemoglobinaemia, haemoglobinuria and anaemia. Although there is certainly a sudden lysis of a considerable number of red cells, an early blood count may not show it, probably owing to a compensatory haemoconcentration resulting from the general reaction to the haemolysin. The crisis passes away by the next day and the anaemia becomes apparent. There is a decrease in the diameter of the red cells, with an increase in thickness (spherocytosis) and an increase in fragility running parallel with the increase in cell thickness. There is no recurrence of the haemolytic phenomenon but the spherocytic character of the cells remains. The diameters and the mean cell volumes progressively decrease and it seems as if the haemolysin not only makes the cell spherocytic but also causes a shrinkage of the cells day by day. This is against the conception that the cell envelope is plastic but not elastic; alternatively it may be that the cells of large volume and diameter are destroyed earlier than the smaller cells. Eventually all the spherocytic cells are lysed and after about three weeks none remains. New cells appear from about the third day after the haemolysis. They are larger than the normal cell of the monkey, both in volume and diameter, and at first are very irregular in size and shape. Later the diameters of these new cells assume a more uniform distribution and the mean cell diameter decreases until the normal blood picture is regained.

Repeated doses of haemolysin over a period of four days produced a fulminating haemolytic anaemia with repeated attacks of haemoglobinuria, severe prostration and a high bilirubin content of the blood. So severe was this anaemia that a terminal secondary infection supervened, the monkey dying about the eleventh day of the experiment. The degree of spherocytosis was remarkable and the cells became extremely fragile, haemolysis occurring in 0.68 per cent saline. A slight reticulocytosis occurred, although there was no sharp rise in reticulocytes and the bone marrow showed some erythroblastic reaction. The Price Jones curve showed a day-to-day shift to the left and there was evidence of slight new cell formation in the last three curves.

It is suggested that although the life of the spherocyte may be shorter than that of the normal cell, spherocytosis is not an immediate prelude to normal haemolysis. Spherocytosis may lead to intravascular disintegration of the cell, but if the effect falls short of this it does not materially shorten the life of the red cell. A similar state of affair is seen in congenital haemolytic icterus when splenectomy decreases the rate of destruction of red cells but does not markedly affect the spherocytosis.

F. MURRAY

SEN GUPTA, P. C. *Bengal Splenomegaly (A Study of 50 Cases with a Discussion of Aetiology)*. *India: Med. Gaz.* 1943, Aug. 78, No. 8, 371-6. 1 map. [10 refs.]

Bengal splenomegaly is a condition whose nature has been under discussion for more than a decade [see this *Bulletin* 1933, v. 30, 43, 1940, v. 37, 321]. The present article sets forth the characteristic features of it, summarizing them on the basis of 50 observed cases. The cause is undetermined and as long as this is so the non-committal term Bengal splenomegaly may be permitted. A map shows the distribution of the 50 cases discussed and most came from south and

south west Bengal very few only five from adjacent parts of Bihar and Orissa. All 50 were Indians 40 males 10 females. No patient was under 10 years of age nearly one third (16) were between 20 and 25 years. The onset is insidious in most cases occasionally more acute with rigors and intermittent fever. Fever was present at some time in nearly all intermittent in more than half (29) and irregular in 11 of the authors 50. The splenic enlargement was great. In 42 it extended to more than 5 inches below the ninth costal cartilage and there was hepatic enlargement to 3 inches below the costal margin. Other features which might be observed were loss of weight emacia pulmonary catarrh and occasionally ascites and icterus. A table of details of the haematological findings is given which the author summarizes in these words —

It will be seen that there is a moderate degree of anaemia orthochromic and slightly macrocytic in type with increase of reticulocytes. There is no increase in fragility and the indications are that there is no marked spherocytosis in most cases. The van den Bergh test shows increased bilirubin content of plasma in about half the cases. A significant degree of leucopenia with relative decrease of neutrophils and increase of lymphocytes is present in an average case.

There follows a discussion on the cause of the anaemia and of this form of splenomegaly. It is argued that the anaemia is due to increased blood destruction i.e. it is haemolytic in type and the histological changes in the spleen support this. Thickened capsule prominent trabeculae atrophy of Malpighian follicles dilatation of sinuses which are packed with large phagocytes and multinucleated giant cells engulfing red cells and leucocytes.

Epidemiologically it is noticed that the patients come from the highly malarious districts of the Province. The rest of the paper is given up to a short discussion on the possibility of a malarial origin and to specific hypersensitiveness to bacterial infection but without coming to any definite conclusion.

H Harold Scott

BERK L & BULL G M. A Case of Sickle Cell Anaemia in an Indian Woman. *Clin Proc Cape Town* 1943 June 2 No 6 147-52 4 figs (2 on pl)

This account is interesting for two reasons. First because the patient was an Indian woman living in South Africa in whose history there was no suspicion of any negro admixture. Second because the results of transfusion could be accurately followed by reason of the easily recognizable distinction of the donor's from the recipient's cells. The patient a married Indian woman of 22 years had for 11 years been subject to backache dyspnoea on exertion epigastric pain soreness of the eyes and attacks of pain and swelling of ankles feet wrists and hands lasting up to three weeks. Blood smear showed 10 per cent of the red cells sickled a sealed wet preparation showed 15 per cent at once and 100 per cent after 24 hours at room temperature. The cells showed increased resistance to hypotonic saline haemolysis began at 0.45 per cent 65 per cent of the cells haemolysed at 0.3 per cent and a few resisted haemolysis even in distilled water. Smears of the sternal marrow gave 35 per cent of the nucleated cells as of the red cell series (normal 10.9-14.5). After a transfusion of

two pints of blood her temperature rose to 104.5 F she had a rigour and complained of pain in the splenic region and left shoulder. Her blood count fell to below post transfusion level. She had another haemolytic crisis some 20 days later returning in a week to the previous state. After the transfusion there was a rise in the red cell count and during the next week the count of the patient's own cells was unchanged but that of the cells from the donor fell—that is during the first haemolytic crisis (which immediately followed the transfusion) it was the donor's corpuscles which haemolyzed. In the second crisis haemolysis of the patient's own cells was occurring.

H. Harold Scott

EVANS W. Elliptical Erythrocytes. *J. Path. & Bact.* 1943 July 55 No 3 378-81 1 fig.

A Nigerian native with a chronic punched-out ulcer of the leg tested for the sickle cell trait showed no evidence of sickling but approximately 94 per cent of his cells were oval and the author believes to be the first recorded case of ovalocytosis in an African. There was some anaemia the first count being—erythrocytes 4 160 000 per cmm haemoglobin 80 per cent (11.6 gm Hb per 100 cc) leucocytes 9 000 per cmm (neutrophils 19.5 per cent eosinophils 27 per cent lymphocytes 4.5 per cent and monocytes 8.5 per cent). Microfilariae of *A. persians* were present in the blood and ova of *A. scaris lumbricoides* in the stool. The sternal marrow picture showed in percentages polymorphonuclears 26.75 neutrophil metamyelocytes 11.25 neutrophil myelocytes 3.75 myeloblasts 0.75 eosinophil 15.0 eosinophil metamyelocytes 3.25 eosinophil myelocytes 1.25 lymphocytes 16.0 monocytes 4.5 normoblasts (all types) 15.0 megaloblasts nil and promyelocytes 4.5. About 80 per cent of the mature red cells were oval erythroblasts. The normoblasts were of the large early eosinophilic type in outline. The normoblasts were of the large early eosinophilic type comparable with those seen in conditions of prolonged peripheral loss of blood. Later a Price-Jones curve was made and the mean diameter of the major axis of the oval cells was found to be 8.3μ and that of the minor axis 5.29μ giving a mean cell area of $34.37\mu^2$ which would correspond with a mean cell diameter of 6.7μ for circular cells. During a reticulocyte count with the dry brilliant cresyl blue supravitral staining method the oval cells assumed a circular form within five minutes of preparing the specimen and the same effect but to a lesser degree was found to occur with O-good's cresyl blue solution. Ovalocytosis is not normally considered to be associated essentially with anaemia but it is thought because of the presence of large early eosinophilic normoblasts in the marrow suggesting prolonged blood destruction for which no obvious cause was found that in this patient the elongated cells may have been more vulnerable to destruction by the spleen and circulating monocytes. A blood smudge of the patient was examined and found to have cells of normal shape but which were celled after 24 hours in a vaseline-sealed preparation.

F. Mur atroyd

MISCELLANEOUS

GARLAND L H Tropical Diseases of Interest to the Radiologist
[Editorial] *Radiology* 1943 July v 41 No 1 75-7

The editor observes that the aeroplane and the present war have resulted in the exposure of large numbers of Americans to various tropical diseases. Some of these may give radiographic evidence of their presence in persons who may be sent for radiological examination for other reasons. The radiograph may show the enlarged spleen of malaria and other tropical diseases, amoebic abscess, calcified filariae, lung changes due to paragonimiasis, calcified schistosome eggs in the urinary tract or bone changes due to leprosy, syphilis, jaws mycetoma, ainhum or tropical ulcer, while *Ascaris* may be outlined with barium in a radiograph of the abdomen.

J F Corson

- i MORGAN A A & SQUIRES B T Onyala in Northern Bechuanaland *South African Med J* 1940 June 22 v 14 No 12 231-3
2 figs
- ii SQUIRES B T A Further Note on Onyala in the Bechuanaland Protectorate *Ibid* 1943 Sept 25 v 17 No 18 292-3 1 map

i Onyala was reported in Southern Rhodesia in 1924 and in the Union of South Africa in 1938 [this *Bulletin* 1939 v 36 157]. One of the authors observed cases in Bechuanaland as long ago as 1930 and in the present paper are recorded 24 cases from the Francistown area.

There were 19 males and 5 females, most of the patients were aged about 16 to 30. The seasonal incidence did not coincide with that of any other disease. Two stages are described: the prodromal stage characterized by headache, malaise and generalized pain, never shorter than one day and sometimes lasting for three; and the bleeding stage with haemorrhage from the nose and mouth and sometimes haematuria and melaena. The pathognomonic sign is the presence of tough haemorrhagic bullae with sharply defined margins on the nasal or buccal mucosa. In one case 10 bullae were present on the third day, thereafter they disappeared, the mouth being clear by the 12th day.

Platelet counts varied between about 5 000 and 20 000, haemoglobin from 40 to 75 per cent, serum calcium from 7.5 to 12.6 mgm per 100 cc. The ascorbic acid content of the urine did not appear to have a significant bearing on the disease; moreover most of the patients were well nourished.

Treatment consisted of intramuscular injection of human blood but there was difficulty in finding donors free from malaria and syphilis. Calcium, iron and orange juice were also given; there were no deaths.

ii In the second paper 52 cases are reported from the same area. In these again the predominance of males was evident. Treatment with whole blood did not seem to be specific; there were five deaths. No fresh light can yet be thrown on the aetiology of the disease, which can only be described as an idiopathic form of thrombocytopenic purpura exhibiting the characteristic bullae peculiar to itself. The author indicates that there is reason to think that the incidence of the disease is increasing.

Charles Wilcocks

MACNAUGHT W W & MURRAY LAYON R M Respiratory Conditions in African Soldiers Sept 11 394-5

An Analysis of Acute
Brit Med J 1943

Of 1750 Africans admitted to a West African hospital 375 (30 per cent) suffered from respiratory infections. Lobar pneumonia accounted for 76 cases and the authors remark that although the physical signs do not differ from those observed in Europeans except for a rather higher incidence of lesions of the upper lobes the response of the Africans to sulphapyridine is more dramatic than that of the Europeans. Nevertheless in spite of this apparently rapid recovery resolution is no quicker than in white men. Bronchopneumonia was present in 52 it responds well to sulphapyridine. Only seven cases of pulmonary tuberculosis were seen. The commonest disease was bronchitis. A case of paragonimiasis as diagnosed treatment with emetine was successful.

An important aetiological factor in these cases of respiratory disease appeared to be chilling. The African does not withstand the effects of cold so well as the European. Sleeping on deck during sea transit when the night air is cold appears to affect the African severely, there was a peak of incidence in January when the weather was at its coldest and the European community at its healthiest.

Charles H Wilcocks

TURNER E L BENT M J HOLLOWAY G D CUFF J R & QUINLAND W S Nutritional Deficiency as an Etiologic Factor in Icterus accompanying Pneumonia in the Negro 1943 Sept 36 No 9 603-8 2 figs [27 refs]

The authors found that jaundice developed in 50 out of 74 cases of lobar pneumonia in adult negroes. This is an unusually high incidence. Various reasons for the occurrence of jaundice in lobar pneumonia have been suggested one of them being that the cholaemia is of pulmonary origin. In experiment on rabbits failed to support this explanation. To determine whether there was any evidence of a basic racial physiological factor blood studies were made on 94 normal negroes aged 6-23 years. All the tests gave results within normal values.

Most of the 74 patients with pneumonia were very poor and had badly balanced and overcooked food during that period (1936-38). Also unemployment among negroes in the district was very high. A common form of diet consisted of corn bread fat side-meat turnip greens and sorghum (millet) and the food was much overcooked. As there is increasing experimental evidence that pathological changes in the liver are related to nutritional deficiency it was thought that the poor diet might make the liver more vulnerable to pneumococcal infection. The authors therefore made the following experiment to test this.

Twelve dogs were given the above diet for 21-49 days and eight control dogs were given a well balanced diet for 27-55 days. Then pneumonia as induced by injecting the lungs with a culture of pneumococci (Type 1 Robertson) mixed with mucin and autogenous blood. Van den Bergh tests were made before the induction of pneumonia and twice daily afterward. The former tests were all negative.

All the seven surviving control dogs gave negative reactions after the induction of pneumonia while the nine surviving dogs on the restricted diet all gave positive reactions. The livers of the control dogs showed cloudy swelling and congestion those of the others however showed fatty degeneration most intense in the centre of the lobule.

The authors conclude from the experiments and clinical evidence that the high incidence of jaundice in their patients in 1936-38 was related to improper nutrition and suggest that more attention to diet should be paid in pneumonia.

J F Corson

VILLARINO ULLOA R. Contribucion al estudio del *ulcus tropicum* en Fernando Póo [*Tropical Ulcer in Fernando Póo*] *Med Colonial* Madrid 1943 Oct 1 v 2 No 4 258-72

The author gives brief notes of 58 patients with tropical ulcer phagedaenic and other observed by him in Fernando Po. Before starting treatment he examines the fluid for spirochaetes. He found them in 26 of the 58. The majority (16) of these were from the north east and east of the island nine from the west and one had come from Calabar. If spirochaetes are found he gives arsenicals such as neosalvarsan and healing is rapid. Those who did not show spirochaetes did not respond to this treatment and time was wasted in trying it hence the need for examination before beginning treatment. These others respond to antiseptics of various kinds. Dakin's solution hydrogen peroxide potassium permanganate thymol etc.

H Harold Scott

KEAN B H. Death due to Akee Poisoning in Panama. *Amer J Trop Med* 1943 May v 23 No 3 339-41

A healthy negro boy six years old was suddenly seized with an attack of vomiting during the afternoon of the 28th February 1942. He refused his supper and went to bed at 8 p.m. apparently well again. He had no fever and stated that he did not feel sick. At 2.30 a.m. March 1st he awoke and out deliriously kicked his legs and died. The whole length of illness from the first symptom till death including the calm period [apparently some six hours] was less than 12 hours. The history is typical of an acute case of akee poisoning.

[This clear and succinct report is of great interest and of no little importance. When the abstracter first brought forward evidence that the Vomiting Sickness of Jamaica and Akee Poisoning were one and the same doubt was expressed because akees were imported in considerable quantity to Panama and nevertheless cases of the disease were not known there. The explanation offered was that ripe fruit i.e. safe fruit was imported and not fruit in any of the potentially dangerous states which SCOTT had defined [see this *Bulletin* 1917 v 9 90]. This case the first recorded on the Isthmus of Panama effectually disposes of this doubt.]

H Harold Scott

DE WAAL H L & PRETORIUS T P. South African *Senecio* Alkaloids Part 6 —The Toxic Alkaloids of *Senecio scleratus* sp. nov. Schweikerdt. *Onderstepoort J Vet Sci & Animal Industry* 1941 July & Oct v 17 Nos 1 & 2 181-90 2 figs

LEVER R J A W Mosquitoes in Viti Levu December 1942 to February 1943 Agric J Fiji Suva 1943 v 14 No 1 16
[Summary taken from Rev Applied Entom Ser B 1943 Oct v 31 Pt 10 185]

Aedes aegypti L which breeds regularly in houses and *A vexans* Mg which breeds in ditches puddles and ponds and bites in houses at night caused great annoyance in Suva in December 1942 and January 1943. Later in January the common mosquito in the north west and north of Viti Levu was found to be *Culex fatigans* Wied. Collections of larvae made in and near Suva during February consisted principally of *A aegypti* from tins and drums 4 *scutellaris* Wlk from rot holes in trees tyres shells and soapstone and earth and the latter also from Skuse streams and *C fatigans* from drains in soapstone and dirty pools. The larvae are preyed on by the Notonectid *Anisops cleopatra* Dist and dragonfly nymphs.

KING W A FOEH L TOFF LET J & MIDDLEAUFF W W New
Distribution Records for the Mosquitoes of the Southeastern United States during 194 J Eco E 10 1943 Aug 36 No 4 53-7

HOARE C A Bioloical Races in Parasitic Protozoa Biol Reviews
1943 July 18 No 3 137-44 [57 refs]

The term bioloical race has frequently been employed without any realization of its precise meaning. This is perhaps more particularly the case with those parasitic protozoa which are liable to produce disease in man and animals. Thus not infrequently because a parasitic protozoon living in one host is incapable of establishing itself in another host which nevertheless harbours a seemingly morphologically identical parasite of its own these two parasites are regarded as distinct species and are accordingly given distinct specific names. This tendency has in some quarters increased to such an extent that the mere discovery of a certain parasite in a new host has been regarded as sufficient justification for the establishment of a new species and the introduction of a new specific name without any attempt having been made to prove or disprove identity with similar if not morphologically indistinguishable parasites in other hosts. This procedure has often been responsible for considerable confusion in nomenclature which might frequently have been avoided if the real significance of biological races as applied to parasitic protozoa had been understood.

In his review the author examines the status of biological races which he defines as such subdivisions of a morphological species as are distinguishable by differences in biological characters only. In the case of parasitic protozoa these differences are to be found in various aspects of the host-parasite relationship. Thus there are races which differ only in that they parasitize different hosts (host specificity) or there are races which produce different types of disease in the same host. One race may differ from another only in being more virulent to a particular host. Furthermore it will frequently be found that the biological races of a certain species will as in the case of bacteria stimulate the production of specific antibodies which may serve as a

means of distinguishing them from one another. All these various criteria for distinguishing biological races are carefully discussed by the author who illustrates his remarks by frequent reference to the well known haemoflagellates haemosporidia and intestinal protozoa. He is to be congratulated on the manner in which he has tackled a most controversial subject and it is to be hoped that his review will do much to clear away many of the misconceptions which exist regarding the distinctions which should be drawn between species and biological races.

C M Henyon

DOYLE W L. The Nutrition of the Protozoa. *Biol Reviews* 1943 July v 18 No 3 119-36 [Numerous refs.]

In this review the author summarizes advances which have been made in recent years in our knowledge of the cultural requirements of protozoa in pure or mixed culture in artificial media. These have shown that successful growth and propagation are influenced by many factors apart from the main constituents of the medium such as the type of glassware and cotton plugs used, the pH adopted, the alterations caused by sterilization, the presence or absence of growth factors including vitamins and minute quantities of inorganic materials containing iron, manganese, zinc, copper, vanadium and molybdenum, and the many changes which take place in the composition of the medium as the culture progresses. The results so far obtained largely through the investigations of the LWOFFS, PRINGSHEIM and HALL, to mention only a few of those who have devoted themselves to these studies, have enabled certain of these workers to draw up a nutritional classification of the protozoa in place of the older division into holophytic, saprophytic, parasitic and holozoic forms. There is, however, nothing final in such a classification for the author admits in his review involving the quotation of over 300 publications that our knowledge of metabolism of representative Protozoa remains fragmentary. [Those who are interested in the nutrition of the Protozoa cannot do better than study the author's comprehensive summary of present-day knowledge and his long list of references to the literature of the subject which cover both free living and parasitic forms.]

C M Henyon

BRICEÑO ROSSI A L. La coccidiosis en el hombre. Primer caso de *Isospora hominis* en Venezuela. [Coccidiosis in Man.] *Gac Med de Caracas* 1943 Mar 15 v 50 No 5 55-9 [12 refs.]

In the faeces of a child three years of age a coccidium belonging to the genus *Isospora* was discovered. The parasite was identified as *Isospora hominis*. Though cases of this infection have been recorded from other parts of S. America, this is the first case to be noted in Venezuela. The child suffered from concomitant infections with *Balantidium*, *Ascaris* and *Trichuris*. The paper gives a list of the earlier records of human *Isospora* infections.

C M Henyon

VAIL D. Chorioretinitis associated with *Toxoplasma*. *Proc Roy Soc Med* 1943 Oct v 36 No 12 629-32 (Sect of Ophthalmology 21-4)

This description of chorioretinitis associated with toxoplasma is based on two papers which have appeared in American ophthalmic

literature The first by KOCH WOLF COWEN and PAIGE (January 1943) deals with the disease in infants while the second by VAIL STRONG and STEPHEN ON (February 1943) deals with the condition in older children and adults The author states that the first case was one recorded by JANU in 1923 who noted the presence of parasitic cysts in the retinal lesion of the right eye of an infant who had microphthalmos of the left eye and increasing hydrocephalus from birth WOLF COWEN and PAIGE (this Bulletin 1940 v 37 236) demonstrated toxoplasma in granulomatous lesion of an infant who had died of congenital encephalitis at the age of 31 days There was a condition of chorioretinitis of both eyes

In congenital cases the diagnosis according to SABIN (this Bulletin 1943 40 637) can be made by the four symptoms—hydrocephalus or microcephalus cerebral calcification chorioretinitis disturbances of nervous function KOCH believes that the intra-ocular lesions of toxoplasma encephalitis have certain characteristics which distinguish them from other forms of choroiditis Among these are regularity of bilateral involvement of the macular region tendency to bilateral occurrence of other than ocular lesions presence of massive chorioretinal degeneration extensive connective tissue proliferation and heavy pigmentation tendency to associated congenital defects in the eyes and constant clarity of the media in the presence of severe chorioretinitis In the authors' opinion however there is nothing in the ophthalmoscopic appearance of the lesions that is characteristic at least in older children and adults who have been under his observation

C M Wenyon

VAN DER MEER G Mille & BRUG S L Infection a pneumocystis chez l'homme et chez les animaux (Pneumocystis Infection in Man and in Animals *Ann Soc Bel de Med Trop* 1943 Dec 31 22 No 4 301-7) On 70 slides (20 ref)

In smears of the lungs of a three months-old child which had died of congenital malformation of the heart cysts of *Pneumocystis carinii* were discovered These resembled in every way the cysts discovered by CHAGAS in 1917 in the lungs of a man who had died of trypanosome infection and which at one time he regarded as possible stages of development of the trypanosome Subsequently he abandoned this view and thought that there might have been some interchange of films made from animals Though parasites of the same kind do occur in animals the findings recorded in the paper under review render it probable that CHAGAS actually did discover cysts in his human material This is all the more likely since the authors have discovered the cysts in the child were led to examine lung smears from other human cases In total of 104 examined the same parasite was found in mice and guinea-pigs

The parasite occurs in the form of cysts about 10 microns in diameter and contains when fully developed eight sickle-shaped bodies Apart from the cysts the smears reveal multinucleate masses of rose coloured material which in sections have a honeycomb appearance These masses are often associated with the cysts and seem to be a stage in the development of the parasite the features of which are illustrated in two plates in black and white In a footnote the authors

point out that the present account is published in French for the benefit of those who are unable to read the original Dutch paper the reference to which is *Ned Tijdschrift voor Geneeskunde* 1942 v 86 III No 33

C M Henson

**LADELL W S S Effects of drinking Small Quantities of Sea Water
An Experimental Study *Lancet* 1943 Oct 9 441-4 1 chart**

The effects of drinking sea water on the chloride and water balance and on urea excretion are reported and discussed. Subjects subsisting on a diet low in chloride and water content were deprived of water for various periods and then given in different experiments moderate (540 cc) or minimal (60 cc) amounts of fresh water with or without 180 cc of sea water. It was calculated that the maximum intake of sea water (containing 3.5 per cent sodium chloride) from which all the sodium chloride would be excreted by the kidneys was of the order of 400 cc per diem. Accordingly in a further experiment the salt water was increased to this theoretical maximum while the fresh water supply was first set at 240 cc for several days and for the last 36 hours totally withheld the daily intake of salt water being increased to 600 cc.

General confirmation was obtained of the data on which the theoretical estimate of a permissible sea water intake of 400 cc per diem was based—that the basic level of urine excretion of a man in total or partial water-debt is about 400 cc per diem—that at low levels of intake at least 66 per cent of the ingested sea water is also excreted as urine—that the kidney can excrete urine containing sodium chloride concentrated to about 2 per cent. The formula which relates these data and expresses the balance between the sodium chloride ingested in the sea water (x cc NaCl concentration = 3.5 per cent) and the sodium chloride excreted in the urine is

$$35x = (400 + 0.66x)20$$

[35x represents the sodium chloride intake in milligrammes]

Thus for the man on the raft totally or partially deprived of fresh water the daily ingestion of amounts of sea water up to 400 cc represents a slight gain to the body of water because the extra water lost is less than the extra water ingested.

The effects on urea elimination are also significant. When the body is totally deprived of water the level of urea in the urine in due course reaches a maximum. This reduces the urine plasma urea ratio and accordingly the urea clearance diminishes and nitrogen retention occurs. When small supplements of fresh water are taken this sequence occurs more slowly. The ingestion of extra sea water (up to 400 cc) increases the urine volume and augments the urea clearance provided the urine plasma urea ratio has not diminished. Drinking sea water in the amounts stated therefore diminishes or prevents nitrogen retention.

[A footnote to the above paper points out that the M R C committee on the care of shipwrecked personnel did not recommend the drinking of sea water in *Medical Research Council War Memorandum No 8*

A Guide to the Preservation of Life at Sea after Shipwreck (H M S O 1943). The decision not to do so was based on other relevant factors besides the evidence given in the above paper.]

J S Weiner

New and Old World genera. Lane & Cerqueira in the work under review include 150 New World species (and one variety) of which 39 are described as new. They deal with the males of 122 species the females of 147 the pupae of 53 and the larvae of 89 species. Some of the species described are not known as adults in the wild state and carried out a lot of rearing work and as the above figures show have considerably increased our knowledge of the New World species.

Lane & Cerqueira distribute the species of American Sabelline mosquitoes amongst nine genera three of which they sub-divided into subgenera. These are *Triclosopon* (with subgenera *Triclosopon*, *Lima* (g n), *Loiplessenia* (" n), *Shannoniana* (sg n), *Leocelia*, *Ctenocephala* and *Hylconops*), *Heomyia* (with subgenera *Heomyia*, *Nuneia*, *Cruvia* (g n), *Menolepis*, *Antunesmyia* (g n) and *Dendromyia*), *Phonimys*, *Limatus*, *Sabethes* (with subgenera *Sabethes*, *Sabethodes* and *Sabethinus*).

The author takes care to list (on page 688) the new subgenera they have rected and the new species they have described. They would have earned additional gratitude from those interested in questions of nomenclature if they had listed or even merely indicated with some symbol such new synonymy as they have proposed. A systematic catalogue of the valid species would also have been a useful addition and not a little of place in a work as comprehensive as the present one.

The notes on distribution are copious and it appears that the extent of these is due to the fact that the two authors had access to collection totalling some 60,000 specimens of sabethine mosquitoes taken by the Serviço de Febre Amarela and the Serviço de Estudos e Pesquisas sobre a Febre Amarela organized by R. C. Shannon.

The authors state that the book is based on work carried out under the auspices of the Serviço de Estudos e Pesquisas sobre a Febre Amarela of the Brazilian Ministry of Education and Health in co-operation with the International Health Division of the Rockefeller Foundation and the Institute of Hygiene of the University of São Paulo. It should be noted that the authors are also investigators of jungle yellow fever and others interested in the abatement of such a satisfactory means of making trustworthy identification.

The holotype and allotype of the new species described are to be deposited in the Instituto Oswaldo Cruz Rod. Jan. 1940. Paratypes are deposited as available in the entomological collection of the Serviço de Estudos e Pesquisas sobre a Febre Amarela in the parasitological collection of the Instituto de Hygiene da Universidade de São Paulo in the United States National Museum Washington D.C. and in the British Museum (Natural History) London in that order of preference.

John S. Hart

TROPICAL DISEASES
BULLETIN

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SUMMARY OF RECENT ABSTRACTS *

III MALARIA

Epidemiology

Greece especially Epirus is stated by PAMIANNA (p 427) to be the most malarious country in Europe. Blackwater fever is common. Malaria is endemic even in cities but from time to time epidemics which depend on weather conditions break out. Heavy rainfall in the early part of the year is followed by summer epidemics. The malaria season is at its height from August to October and is usual. *P. vivax* is prominent in the early part of the season and *P. falciparum* in the late. In epidemic years *P. falciparum* is prominent throughout. *P. malariae* is found fairly frequently in non-epidemic years but is relatively unimportant in epidemics. [A malaria map of Greece is included in the original abstract.]

CASINI (p 286) COLUZZI (p 287) and PRIAZZI (p 287) write of malaria in Albania. It is widespread along the coast and near rivers and mountain streams to a height of 3 600 feet. The principal vector is *A. maculipennis* var *sacharovi* (*elutus*) but *A. superpictus* is important inland. The peak malaria season is from August to October and at this time *P. falciparum* infections are more common than *P. vivax*. *P. malariae* is much less common.

PAMPANA (p 429) states that except for some mountainous areas and some coastal islands the whole of Yugoslavia is malarious. The highest incidence is in South Serbia and the Danubian plain. The vectors and the endemic periodicity of the various forms of the disease are similar to those which occur in Greece.

PARROT *et al* (p 739) have investigated an area near Constantine Algeria where malaria is endemic with occasional epidemics. *A. maculipennis* var *labranchiae* breeds abundantly in canals and ditches.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 v 40. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

P. falciparum is the commonest parasite found at all places and is concerned in the epidemic outbreaks. Premunition against *P. falciparum* is much shorter and less effective than that against *P. vivax* or *P. malariae* and during an epidemic the proportion of carriers of gametocytes of *P. falciparum* increases considerably whereas the proportion of carriers of gametocytes of *P. vivax* and *P. malariae* remains almost unchanged.

In describing an outbreak of malaria in the Department of Constantine Al ERIA CLASTIER (p. 741) remarks that important factors affecting the severity of the epidemic were the state of undernourishment of the population as a result of bad harvests and the fact that the outbreak coincided with the month of Ramadan during which according to Mohammedan law no food may be taken and no drug given by the mouth between sunrise and sunset.

COLLIGNON (p. 105) gives an account of an epidemic of *P. falciparum* of malaria in the Department of Algiers in 1939. He also (p. 430) notes that the deficient rainfall of 1940 and 1941 resulted in a low incidence of malaria in that Department during 1941.

SIEGFRIED and IZAC (p. 735) describe the malaria of Laghouat south of the Atlas mountains. The disease is not common but occurs in some oases and after periods of heavy rainfall.

BOLRGUIGNON (p. 103) writes of malaria at Elisabethville in the Belgian Congo. *P. falciparum* is the commonest parasite and there is a well marked seasonal incidence on this high Katanga plateau. The rainy season from November to April and the disease reaches its peak in March to May. Seasonal variation depends on the densities of *A. gambiae* and *A. funestus*.

A number of other papers on malaria in the Belgian Congo have been abstracted during the year. These consist largely of surveys of various districts and are chiefly of local interest. The references are as follows: —BARLOVITZ (p. 101), SCHWETZ (p. 107, 217), SCHWETZ and BAUMAN (pp. 103, 211, 217), SCHWETZ *et al.* (pp. 213, 357, 743) and NICOLAI (p. 104). DUREN (pp. 210, 743) and WYMEERSCH and TROLLI (p. 213).

In spite of a general opinion that malaria is not contracted in Addis Ababa (altitude 2500 metres) MARTIN (p. 744) describes 4 cases of local infection. *A. gambiae* breeds in a river bed after the rainy season but never apparently in permanent collections of water.

As a result of investigations in Ceylon extending over three years SIVALINGAM (p. 746) has found that when the incidence of malaria is low *P. malariae* is most in evidence but that during seasonal or epidemic increases *P. falciparum* and *P. vivax* become more prevalent the former being dominant during epidemics. In his opinion an increase to 50 in the percentage incidence of *P. falciparum* heralds a severe outbreak of malaria.

NICHOLS (p. 579) shows to what extent malaria has diminished as a cause of death in the United States since 1900. The decrease has been most marked since 1937 and is no doubt due to the vigorous anti-malarial measures carried out in the Southern States. FAUST and DE BAKER (p. 664) publish a graph showing the trends of malaria mortality in the United States from 1909 to 1940. The expected cyclical increase in 1938-40 did not occur and rates have fallen fairly steadily since 1933-36. The years of the depression. The malaria death rate is a reflection of *P. falciparum* malaria but there is reason to believe that *P. vivax* malaria has also decreased.

Aetiology

KILGUTH (p 284) gives an account of the newer knowledge of the process of development of malaria parasites from the time of inoculation of sporozoites into the vertebrate host particularly mentioning the possible course of development of the unpigmented exoerythrocytic forms. He concludes that the goal for further investigation is the discovery of a causal prophylactic against the sporozoites or against the exoerythrocytic schizonts which arise from the sporozoites.

HUFF *et al* (p 815) propose the name eryptozoite for the first generation of the malaria parasite developing from a sporozoite. This would cover all stages of development after the entry of the sporozoite into a cell (other than an erythrocyte) up to the mature schizont.

KITCHEN and PITTIN (p 109) have studied the cycle of *P. falciparum* by daily observations made on negroes infected by mosquito bite or by inoculation of infected blood. The cycle appears to be very stable. The timing of first appearance and of peak density of trophozoites and gametocytes was virtually identical in naturally infected patients. The timing of key points may be altered in individual patients by natural resistance, acquired immunity or treatment but there are indications that if one interval is lengthened the next is shortened and the cycle is brought back into line. This leads to the belief that events in the cycle are determined before the appearance of trophozoites in the peripheral blood and possibly at the time of inoculation. The sexual forms probably arise from the segmenting asexual parasites but the production of gametocytes probably begins before the end of the prepatent period. The interval of about 10 days between the first appearance (and between the peak densities) of trophozoites and gametocytes indicates that the gametocytes require a period for development over and above that needed for them to accumulate sufficiently to reach macroscopic visibility.

Transmission

ZUMPT (p 7) discusses the races of *Anopheles maculipennis* of which seven have been distinguished in Europe. In view of the restrictions on interbreeding imposed by physiological differences and by lack of mutual inclination of the various races to pair, he suggests that they should be accorded specific rank.

RODHAIN and VAN HOOFF (p 214) note that in Belgium *A. maculipennis* var *atroparvus* probably the only vector of malaria, breeds not only in slightly brackish waters along the coast but also in certain inland localities where the water is quite fresh. HILL *et al* (p 818) remark that in Portugal rice fields form the breeding places of enormous numbers of *A. maculipennis* var *atroparvus*; here also the vector of malaria.

VESSLERLIN (p 742) notes that in Morocco anophelines have been found at least 8 or 9 kilometres away from their breeding places. [The species are not named, presumably they were *A. maculipennis* var *labranchiae*.]

BEKLEMISHEV (p 511) gives an account of his studies on the life history of *A. maculipennis* and other blood sucking arthropods. LAVREKO (p 510) describes a method for the identification of the larvae of three races of *A. maculipennis*. SKOPIN (p 287) reports the dates of the various stages of development of *A. maculipennis* in

Kazakstan and in particular the dates and circumstances of emergence from hibernation. GORITZKAYA (p. 433) produces evidence which shows that mosquitoes (*A. maculipennis*) responsible for the first fresh cases of malaria in Southern Russia may belong to the generation which has overwintered or to the succeeding generation but the latter are the more important.

In Greece the important vectors are *A. maculipennis* (typicus messae and sacharo i) and *A. superpictus*. PAMPANA (p. 427) states that the latter which reaches its peak density later than *sacharo i* is the more efficient vector but *sacharo i* is the more anthropophilic.

SAUTET (p. 110) gives a list of the Anopheles of Syria and Lebanon. *A. claviger* is the only vector of malaria in Southern Lebanon else where *A. sacharo i*, *A. superpictus*, *A. sergenti* and *A. tricolor* are responsible for transmission.

SALITERNA (p. 257) has studied the egg pattern of the nine species of Anopheles found in Palestine.

LEWIS (pp. 55-66) records *A.ambiae* as far north as Wadi Halfa near the Egyptian border. SCHWETZ (p. 7) notes that *A.ambiae* is generally absent at altitudes over 5000 feet in the region of Lake Kivu and Lake Albert in the Belgian Congo.

A.ambiae breed in water fully exposed to sunlight. HADDON (p. 516) has shown that the water in the breeding places of *A.ambiae* reaches much higher temperatures and undergoes much greater temperature fluctuations than the shaded water in which *A. funestus* breeds.

Writing of *A.ambiae* in Brazil CALLEY *et al.* (p. 580) point out that only the light-coloured variety was seen. This mosquito behaved as it does in Africa breeding in fresh water exposed to the sun usually near human dwellings and in the adult state showing marked anthropophilism. The infection rate in the experimental areas was 5.6 per cent compared with 1.5 per cent in species of the *taenioides* group. DEANE and CALLEY (p. 581) investigated the viability of eggs of *A.ambiae* kept in moist or dry shaded sand or mud. After 15 days only 1 per cent or less had survived. If however the female mosquitoes were kept at 10-13°C for 3 days or more after a blood meal they laid abnormal eggs which in certain respects resembled the resistant winter eggs of *A. walkeri* (see PETERS below). CALLEY *et al.* (p. 515) studied the effect of the advent of *A.ambiae* to an area in Brazil previously almost free from malaria. Parasite rates rose to 85.7 per cent and were similar in adults and children. The increase was parallel to the increase in density of *A.ambiae* and was occasioned largely by infection with *P. falciparum*. After eradication measures were commenced the parasite and spleen rates were rapidly reduced.

BLACKLOCK and WILSON (p. 355) have observed that in houses of a West African village although *A.ambiae* was the most prevalent anopheline in the period April-July *A. funestus* was the commoner during September-December. *A.ambiae* breed in small collections of water during the rains but *A. funestus* breed in springs which function only after the rains have persisted for some time. DE MEQUITA (p. 744) gives information on malaria in Angola where the vectors include *A.ambiae* and *A. funestus*. DE MEILLON (p. 110) reports on *A.ambiae* and *A. funestus* the vectors of malaria in the colony of Mozambique and (p. 111) gives a list of the other Anopheles found. In only one area was neither of these two species present there at an altitude of 1260 metres malaria was apparently absent.

RAO (V V) et al (p 9) describe the swarming of 1 *sundaicus* and 4 *subpictus* they note that the former flew two miles from the breeding place to the swarming place.

RUSSELL and RAO (T R) (pp 8 43) describe the swarming mating and oviposition of *A. culicifacies*. Having observed that larvae of *A. culicifacies* are found in rice fields only when the plants are less than 1 foot in height they determined by experiment that the cause of the absence of larvae and eggs when the plants were over this height was probably the mechanical obstruction offered to ovipositing females by the plants and not to the shading of the water by the plants. It is the habit of the female to hover a few inches above the water surface without touching it in the process of egg laying and this hovering is presumably prevented by the growing rice or other similar obstruction. Certain other species of Anopheles were much less reduced by these obstructions.

These workers (p 288) have also studied the life span of 1 *culicifacies* the average is four days but in each batch there were always a few individuals which lived much longer than the rest. In a comparison between a malarious and a non malarious area in each of which *A. culicifacies* was present they (p 289) found that the density of this mosquito was 3-4 times as great in the malarious as in the non malarious district. They argue that the density of the vector is the chief factor in determining the presence of malaria under these conditions an opinion in line with Ross's view of a critical density below which transmission does not occur.

ROY and BISWAS (p 112) found 6 of 719 1 *pallidus* and 5 of 881 *A. culicifacies* with sporozoite infections in Udaipur State Central Provinces India. They emphasize the importance of the former as a vector.

In an account of malaria in the Nilgiris District of the Madras Presidency RUSSELL and JACOB (p 10) note that the only important vector is *A. fluviatilis* which breeds in rice fields irrigation channels hill streams river edges spring pools and wells. In Nilgiris East they found *A. fluviatilis* breeding throughout the year but in Nilgiris West the very heavy rainfall caused this species almost to disappear from July to September. This mosquito is usually found at altitudes not exceeding 4000 feet and adults were most commonly captured in human dwellings. oocyst and sporozoite rates of 9.7 and 10.1 per cent were found but in one hyperendemic area weekly sporozoite indices ranged from 1.5 to 34.8. It seems that there can be few if any more effective vectors of malaria than *A. fluviatilis*. No other infected species were found. Spleen rates varied with altitude — 1200-2000 feet 78.1 2000-4000 feet 50.4 above and below these heights the numbers were small. *P. malariae* was the most common species in Nilgiris East (less common in Nilgiris West) and produced the greatest proportion of enlarged spleens.

COVELL and PRITAM SINGH (p 663) state that near Lake Chilka in the coastal belt of Orissa where malaria is hyperendemic 1 *sundaicus* is the only vector of importance. It is well known that this mosquito breeds in saline water and the optimum salinity appears to be from 600 to 800 parts per 100,000. The authors found nowhere that the presence of putrefying algae and other vegetation favours breeding and that salinity is important only in so far as it promotes the growth of vegetation. If pools and tanks can be kept free from weeds

breeding can be eliminated and this promises to be the most successful method of combating malaria in this region.

INENGAR (p 663) has noted that in the delta region of Bengal areas with a high subsoil water level during the rainy season are much less malarious than areas with a low subsoil water level. *A. philippinensis* is the vector and breeds in ponds yet there is no marked difference in the number and variety of such ponds in the areas in question. Nevertheless the prevalence of *A. philippinensis* was much less in the less malarious villages but it is not known in what way the high subsoil water acts as a deterrent to the breeding of this mosquito.

THOMSON (p 747) has previously noted that in the laboratory larvae of *A. minimus* will develop in water far more heavily polluted with organic matter than the female will accept for oviposition and has now confirmed these findings by field experiments. He has devised a new analytical method (estimation of oxygen absorbed from alkaline permanganate) to investigate the qualitative differences in organic matter. Some rice field and collections of stagnant water contain enough organic matter to repel *A. minimus* but this is not true of other collections which the mosquito avoids so that evidently the quantity of organic pollution does not provide the whole explanation though the quality of the organic matter may be a factor.

The same author (p 748) has shown that *A. minimus* will not lay eggs in water fully exposed to sunlight and that well with vertical sides and with vegetation at the water edge in which the mosquito breeds prolifically may be rendered almost free by removing the vegetation and converting the vertical walls into smooth sloping side.

In spite of the fact that 21 species of Anopheles have been identified in south western Yunnan some of which are vectors of malaria in other parts of the world SWEET *et al* (p 666) report that *A. minimus* which is the most prevalent species is the only one found infected at a rate of 0.9 over a period of 16 months. Infection rates were highest from August to November and there is apparently no transmission in January and February.

LEVER (p 816) notes that *A. punctulatus* the vector of malaria in Melanesia is not known to be present in Fiji. In view however of the great variety of its breeding places it could easily establish itself in Fiji and the greatest vigilance will be necessary to prevent this.

HURLBUT (p 748) has calculated the rate of growth of *A. quadrimaculatus* in relation to temperature and estimates that in northern Alabama there should be 9 or 10 generations each year.

EYLLS and BISHOP (p 817) have shown that *A. quadrimaculatus* can travel a distance of 2½ miles and CLARKE (p 748) has shown that it can travel 8 miles and *A. punctipennis* 10½ miles.

EYLLS and BISHOP (p 667) have found that the movements of *A. quadrimaculatus* out of buildings at dusk and into buildings after sunrise are correlated with the light intensity. During the day the buildings are cooler and more moist than the open air and evaporation is therefore less indoors where the mosquitoes spend the daytime.

The inhabitants of the Okefenokee swamp Georgia United States are free from malaria though the disease is common in the surrounding regions. FROHNE (p 215) shows that the water of the swamp is very acid that sphagnum moss is abundant and that *A. crucians* is the only anopheline found breeding. The common vector of malaria *A. quadrimaculatus* is absent. He relates these findings to the dissolved content of the swamp water which is very high.

PETERS (p 749) points out that *A. walkeri* differs from other North American species in that it overwinters in the egg stage. The winter egg differs from the summer egg in certain respects. It is larger, the floats are longer and a reticulated exochorion extends over the dorsal surface. The winter eggs remain viable even if kept moist at a temperature of -21°C for 72 hours.

BANG *et al* (p 817) have shown that the entry of *A. walkeri* into human habitations at night is largely due to attraction towards artificial light and not to the presence of human beings. The general installation of electric light in rural areas therefore may cause the mosquito to become a vector of some importance.

CARR and HILL (p 745) give an account of malaria in Cuba where the disease is only moderately prevalent. This relative freedom they ascribe to the remarkable porosity of the soil on underlying limestone. Small local epidemics are usually due to man made breeding places. *A. albimanus* is probably the chief vector but *A. crucians* is probably and *A. ustulipes* is possibly concerned in transmission.

In a survey of El Salvador Central America SUTTER and ZUNIGA (p 107) found that splenic indices and parasite rates were highest at low levels of altitude and that *A. albimanus* the only proved vector in the area is an inhabitant chiefly of the lowlands. The incidence of the three malaria parasites was almost the same. *P. falciparum* and *P. malariae* were more commonly associated with the larger spleens than was *P. vivax*. KILLY and ZUNIGA (p 108) have studied the mosquitoes of El Salvador. Eight species of *Anopheles* were found. *A. albimanus* (the only known vector in this area) is a lowland mosquito and is especially prevalent in the rainy season.

BUSTAMANTE *et al* (p 453) have found for the first time *A. darlingi* in the Yucatan peninsula. BEVIER (p 512) reports the first stages of an enquiry into the breeding of *A. darlingi*, the only important vector in the coastal region of British Guiana. LUTY and RAMOS (p 514) remark that in southern Brazil *A. darlingi* may be found up to an altitude of 1000 metres. LUTY (p 515) notes that in Brazil although it does not appear that the pH of breeding waters explains the vagaries of anopheline and malaria distribution yet certain species do exhibit preferences. *A. darlingi* for instance has a marked preference for neutral or slightly alkaline water.

CORRÊA and RAMOS (p 513) give an account of the *Anopheles* of the State of São Paulo, Brazil.

ALBERTO ALVARADO (p 745) gives a description of malaria in Argentina. *A. pseudopunctipennis* is the chief vector in the north-east but has been reduced recently by the control measure taken. In the Litoral area *A. albimanus* appears to be concerned. It is noted that in Argentina infections with *P. falciparum* are unusually mild.

DA FONSECA and CORRÊA (p 516) note that although *A. crucians* has long been suspected as a potential vector of malaria proof has not hitherto been obtained. They have now succeeded in infecting two of 29 specimens with *P. vivax*. AMARAL (p 259) has found oocysts in *A. crucians* and *A. bellator* in Paraná.

FOURSECA (p 515) has infected *A. eiseni* with *P. falciparum* in the laboratory but does not consider that this mosquito is likely to be an important vector of malaria in Brazil because it is not an avid blood sucker of man (and certain other animals).

ROY and GANGULI (p 749) describe their method for preparing precipitating sera for determining the nature of the stomach contents of blood sucking insects and the technique of the precipitin test

Pathology

IVISELY *et al* (p 584) and LACK (p 676) have studied the process of intravascular agglutination of parasitized red cells in malaria. A layer of fibrin or similar substance is deposited on the cells causing them to tick to ether but not to the endothelium. Plasma viscosity increase and flow is reduced. The circulatory damage resulting from these changes includes anaemia, haemoconcentration, anoxia and their sequelae. RIGDON (p 436) writes of the importance of tissue anoxaemia in malaria. This is the result of the rapid destruction of red cells and of a high degree of parasite infection of the remaining red cells. A temporary lack of oxygen causes increased capillary permeability and this results in haemoconcentration. The manifestations of anoxaemia are similar to those of shock. In a study of cardiac lesions in malaria MOHR (p 10) notes that the finer capillaries may be partly or completely blocked by accumulation of parasites with injury to the endothelium and malnutrition of the muscle supplied by these capillaries. In the early stages of such damage treatment may restore the tissues to normal but if neglected permanent mischief may be done with dilatation of heart or aorta.

KOPP (p 10) has noted that the onset of malaria is accompanied by rapid protein and marked reduction of plasma albumin but that globulin and fibrinogen fluctuations show no consistent trends. It is probable that the infection interferes with the synthesis of albumin by the liver and increase in globulin may be due to destruction of red cell. Fever produced by injection of typhoid vaccine or by the in luctotherm did not produce comparable effects.

Immunity

BOYD (p 11) has observed the course of malaria in 388 white patients infected therapeutically with the McCoy strain of *P. vivax* by means of infected mosquitoes. He notes that 69 others failed to acquire infection in spite of bites by infected mosquitoes. The attacks in patients who did not experience remission did not last more than 70 days and in patients who had previously acquired autochthonous immunity homologous or heterologous to the strain used for inoculation subclinical or self limited attacks lasted less than two weeks or cured. The duration of the attacks varied with the parasite count in the blood. The parasite rate may become high and decline slowly (in susceptible persons) or may decline rapidly after a short clinical attack (in persons with some immunity) or the protective mechanism may be vigorous enough to check the rise of parasites before clinical level are attained. It seems therefore that a partly sensitized immune mechanism may be activated gradually or that a fully sensitized immune mechanism may be activated promptly by reinfection.

BOYD and KITCHEN (p 815) note that recovery from an attack of *P. vivax* malaria results in very potent immunity to the homologous strain (the authors evidently refer to spontaneous recovery or at least to attacks which last for a number of paroxysms). In their paper they

do not refer to malaria treated within a few days] They have attempted to hyperimmunize convalescent patients by injecting trophozoites and have found that it is not desirable to begin the injections so long as the primary parasitaemia remains at microscopic levels. The first few injections may be followed by subclinical parasitaemia but later no parasites may be found after the injections at this point the patient is hyperimmune and can withstand a dose of parasites many million times as great as the minimum infecting dose without symptoms or parasitaemia. Experiment indicated that this hyperimmunity could not be ascribed to circulating antibodies.

HILL *et al* (p 818) have studied malaria in a rice growing area of Portugal where *P falciparum*, *P vivax* and *P malariae* are found. They note the gradual development of immunity in childhood.

BOULNOIS (p 741) notes that Senegalese troops from the Ivory Coast and French Guinea stationed near Bone (Algeria) did not acquire malaria although no precautions were taken whereas French and Algerian troops stationed nearby were constantly attacked. Comment is made on the state of premunition of the Senegalese [presumably effective even when they were exposed to new strains].

DJAPARIDZE (p 431) discusses immunity in the people of the Black Sea coast of the Caucasus where the three principal malaria parasites occur. The infections are seasonal and the premunition developed is strictly strain specific. The immunity against *P vivax* is more stable than that against *P falciparum* and whereas the former parasite is the commonest in the blood of children the reverse is the case in adult life. Adult immunity is reflected in the absence of severe forms of disease and in the presence of infected persons who show no symptoms.

Clinical Findings

LINDSAY (p 878) draws attention to the malignancy of pernicious malaria quoting his experiences in a valley noted for the severity of the disease. Pernicious malaria may be an acute emergency in which even minutes may count. The four main types are algid (the patient cold, pulseless and often unconscious), cerebral (the patient either comatose or restless—even violent), haemorrhagic (with bleeding into the skin or from the nose or bowel) and gastro-intestinal (with vomiting, hiccough, colic or choleric symptoms). Intravenous quinine is indicated in all these forms of malaria and the author's rule has been to give intravenous quinine to all patients brought in unconscious no matter what other treatment may be needed. Quinine intramuscularly is absorbed more slowly than when given by mouth and has no place in the treatment of pernicious malaria except in young children. The author remarks that a microscope has little place in the diagnosis of pernicious malaria. A negative blood slide has sent many to the grave. [The emphasis of this short paper is on the acute danger of pernicious malaria (presumably due to *P falciparum*) and on the necessity for immediate drastic treatment. The author states that his conclusions are not meant to have any wider application than to that place, that community and that period nevertheless medical officers on active service would do well to bear them in mind.]

ECKSTEIN (p 516) describes the various clinical types of malaria in children which include forms simulating intestinal diseases, malarial nephritis and cirrhosis of the liver. He also (p 517) subdivides the

affections of the nervous system (usually due to *P. falciparum* infections) into categories which include comatose neuritic hemiplegic neuropathic and psychotic forms.

GONTAIEVA (p. 436) describes a severe form of benign tertian malaria which occurs in children in central Russia. There is a sudden appearance of cerebral symptoms and sudden death often takes place before treatment can be given. The only effective treatment is immediate injection of atabrin or quinine. The history of these patients suggests a benign tertian infection in the previous autumn and relapses during the current year. TAPEYEV (p. 668) also describes this fulminant form of *P. vivax* malaria which he distinguishes from the well known forms of cerebral malaria due to *P. falciparum*. The onset is sudden with shivering, vomiting, severe headache, convulsions, coma, Cheyne-Stokes respiration and death in 2-3 hours. No definite explanation can yet be given for this syndrome but it is suggested that it may be due to anaemia of the brain. Cases of meningitis or mushroom poisoning have been mistaken for it and some cases may resemble heat stroke. The patients may be saved by injection of quinine or atabrin.

SCHOENBACH and SPRINGARN (p. 359) make the point that malaria in drug addicts acquired by the use of a common syringe for intravenous injection of heroin rarely conforms to the typical clinical picture of malaria. Suspicion should be raised in patients showing signs of encephalopathy, thrombosed basilic veins and irregular fever. JAVETT and SACKS (p. 216) and KILHAM (p. 217) describe cases of meningeal septicaemia which simulated malaria in that tertian or quartan periodicity of fever was present. Leucocytosis was a feature in each case.

HELLIG and VISWESWAR (p. 360) describe a case in which general oedema (associated with urinary signs of nephritis) disappeared after treatment with quinine. No parasites were found in the blood. In a second case in which oedema disappeared after treatment with diuretics ascites persisted but finally disappeared on treatment with quinine. DUTT (p. 668) describes a case of haematuria during attacks of malaria which may have been due to malarial nephritis.

KOPP and SOLOXON (p. 582) have studied the effect of malaria on the liver in patients inoculated with *P. vivax* and in whom 4-12 paroxysms were experienced before treatment was given. Impairment of function occurred but was transient. Function was fully restored 3-6 weeks after the malaria was terminated.

RICE and WATSON (p. 819) note that in the Tennessee Valley there is little or no correlation between malaria morbidity and the presence of parasites in the blood.

WILCOX (p. 437) has prepared a manual for the microscopical diagnosis of malaria in man. The Medical Department Sierra Leone (p. 437) has described a modification of Field's method of staining.

DUNNLEY *et al.* (p. 11) have carried further their work on the complement fixation test in malaria in which an antigen prepared from *P. knowlesi* is used. The test was positive in 81.6 per cent of patients in whose blood malaria parasites were present and in 88 per cent of 317 patients (177 of whom were proved not to be suffering from malaria the remainder being malarial) there was agreement between the test and the blood findings. Sera from patients with leprosy, amoebic dysentery and Chagas disease gave a high proportion of positive results. The conclusion is that the test is highly specific and may be used to supplement blood examination in the diagnosis of malaria.

NINOGI (p 750) describes the antigen from *P. knowlesi* used in the complement fixation test for human malaria the test is positive in *P. malar* infections

HARSEN and HARRI (p 669) report on the Wassermann Kahn and Memiche tests in benign tertian malaria in patients free from clinical signs of syphilis Fresh infections gave positive results in up to 90 per cent of patients tested after the fourth or fifth paroxysm the Kahn gave most positive results The serum remains positive for some time after parasites have disappeared from the blood In all more than half of 1 000 tests were positive DE GIOAT (p 820) has applied the various Kahn tests to the sera of 18 patients with malaria but clinically free from syphilis Seven were positive to the Standard 10 to the Presumptive and 14 to the Verification (general biologic type) Those positive to the Standard test became negative in 1-3 months The Verification test persisted longer but eventually became negative in all cases except one

Charles W Sloocks

To be continued

RABIES

A REVIEW OF RECENT ARTICLES XL *

1. *Virus*

DE OLIVEIRA¹ has produced a tome of some 120 pages which gives a detailed account of his painstaking observations on different methods of propagating the virus of rabies in cultures The article is divided into five chapters In the first reference is made to the strains of virus employed in these experiments One of these was a fixed strain which on 27.9.1941 had been passaged 2 013 times by the intracerebral route in rabbits the other was a street strain recovered from a rabid dog The fixed strain (Lisbon) is undergoing some modification in that the incubation and duration of the disease are now shorter in the inoculated rabbits and the virus appears to be more sensitive to the action of glycerin and desiccation than in earlier passages The second chapter deals with experiments made to propagate the virus in tissue cultures [LEVADITI in 1914 showed that it was possible to cultivate the virus in nerve ganglia implanted in monkey plasma STOLL in 1930 succeeded in propagating the virus in the brain of rabbit embryos in rabbit plasma and also although less satisfactorily in the heart of chick embryos in rabbit plasma KANAZAWA in 1936 and 1937 cultivated the virus of rabies in the brains of rabbit embryos suspended in a liquid phase (Tyrode's solution) PLOTZ and REAGAN (this *Bulletin* 1942 v 39 589) cultivated street virus in chick-embryo brain tissue in monkey serum Tyrode's solution] The present author has employed a method similar to that of WEBSTER and CLOW (this *Bulletin* 1938 v 35 168) [see also SCHULTZ and WILLIAMS (this *Bulletin* 1938 v 35 641)] whose medium consisted of a thick suspension of the brain tissue

For the thirty ninth of this series see this *Bulletin* v 40 p 651

¹ DE OLIVEIRA J C Sobre o vírus rábica e os métodos de cultura *4 quinquésimo I. Bact. Ca. para P. sta. a.* 1940 v 8 11-131 5 fig (1 coloured) on 13 pls [Bibliography] English summary 110 l

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of mouse embryo in Tyrode's solution with 10 per cent monkey serum added and who made 42 passages of mouse brain virus in such cultures. In addition to monkey serum he tried human rabbit donkey and guinea-pig serum these last three sera gave unsatisfactory result, the virus died out on the second passage when donkey serum was used and rabbit and guinea-pig serum gave negative results. His passage were made in the medium with human serum. There was no indication that the virus content of such culture was high enough to justify them as a source of virus for vaccine production and this agrees with the final observation of the American workers [see WEBSTER and CUMMINGS, *Bulletin* 1942 39 57].

The third chapter records the first attempts to repeat PERAGALLO's experiment with the *Bulletin* 1938 35 168. That author employed 15-day-old chick-embryo in egg-lain to have cultivated the virus of rabies in the chorio-allantoic membrane. He also published drawings of Negri bodies in the epithelium of the infected membranes. The present author employed a simple technique (no removal of a window and production of an artificial air sac as in Burnet's method) to inoculate the chorio-allantoic membrane of 10 to 17-day incubated de clopin chick embryos. The eggs after inoculation with either street or fixed virus were incubated at 35°C later at 36 to 37°C and the eggs were opened from the fourth to the sixth day. Nine series of inoculations were made either with fixed virus and one with street virus and a large number of eggs were used with negative result except none in tance in which the chorio-allantoic membrane of a 13-day egg in the first passage of the fixed virus produced infection for a rabbit.

In the fourth chapter a description is given and this is illustrated by 25 figures on 13 plates of lesion observed in the chorio-allantoic membranes of de clopin chick embryos inoculated by the Burnet method with rabies virus suspensions of normal rabbit and mouse brain both powdered glass physiological saline suspensions of normal chorio-allantoic membranes animal sera etc. (The non-specific lesions observed and recorded are similar to those observed by BURNET F M (Medical Research Council Special Report Series No 220 1936) BURNET F M & GALLOWAY J A (*Brit J Exper Path* 1934 15 105) GOLDSORTHY E & MOPPETT W J (*J Path & Bact* 1937 44 369).

In the chorio-allantoic membranes inoculated with rabies virus all these non-specific lesions may be found and some of the membranes of young embryos although they were found to be infected with virus by rabbit or mouse inoculation showed no lesions. The only lesions recorded in some eggs inoculated with rabies virus as an infiltration not seen in the other inoculated eggs referred to above as having no lesions were not recorded but this was not constant and the rabies virus produced no specific lesion in the chorio-allantoic membrane and in none of the membranes. The general conclusions that the rabies virus could not be determined in the chorio-allantoic membrane and in the membranes of embryos (4 to 14-day old) were Negri bodies in the membranes. Attempts were made to increase the receptivity of the membranes for rabies virus and these experiments with young de clopin chick embryos are described in the fifth chapter. BURNET's technique was employed but no success was attained with 10- to 14-day-old embryos even when the inoculation

virus was suspended in Tyrode's solution and diluted serum instead of in physiological saline. Graded doses of virus were applied to the chorio-allantoic membranes (10 to 13 day old embryos) prior to inoculation with rabies virus but although the membranes of the first and second passage were infective for rabbits subsequent passages gave negative result. One per cent ascorbic acid had no deleterious action on the virus but its presence in the inoculum did not affect the non survival of the virus in the chorio-allantoic membranes of 10 to 14 day old embryos. Finally KLIGLER and BERNKOPF's [this *Bulletin* 1939 v 36 724] results were confirmed. It was found possible to propagate the virus in 4 to 5 day old embryos the eggs being opened on the 9th to 10th day after inoculation for passage. Virus was detected by mouse inoculation in the chorio-allantoic membranes and brains of the embryos of inoculated eggs up to the ninth passage and the experiments were not continued. However while a detailed estimate of the virus content of the inoculated chorio-allantoic membranes was not made it was found that a suspension of the membrane of the ninth passage had a titre of only 10^4 and this was equivalent to the virus titre of the eight passage tissue culture referred to in the second chapter. Mouse brains were shown to have a virus titre of at least 10^5 and rabbit brains sometimes showed a similar virus content. With regard to tissue cultures reference is made to the possibility of accidental contamination by the virus of lymphocytic choriomeningitis [Such contamination of cultures has been recorded by CASALS WRIGHT and WEBSTER this *Bulletin* 1940 v 37 622].

SIGURDSSON has emphasized that virus material to be used for the preparation of rabies vaccine should contain virus in high concentration be free of contaminating viruses and bacteria and be as easily prepared and inexpensive as possible. Up to the present tissue cultures and chick embryos have been found poorer in virus than animal brain tissues. His paper reports attempts to increase the yield of rabies virus in the chick embryo. The author used two strains of fixed virus one the old Pasteur strain which had had a very large number of mouse brain passages and the other was strain 15811 which had been passaged 114 times in mice. It was fixed in virulence but it was more invasive than the old Pasteur strain. Preliminary experiments were made by inoculating virus on to the chorio-allantoic membranes and these showed that strain 15811 reached the embryo brain more easily than the Pasteur strain. The former strain was used for subsequent experiments. Virus was inoculated intracerebrally into 8 day old chick embryos and the virus content of pooled embryo brain was estimated after incubation of the eggs at 35 C to 36 C for different lengths of time. The virus reached a titre of $10^{5.5}$ to $10^{6.5}$ in five to six days. The author is of the opinion that these virus titres which are somewhat higher than those recorded by other workers and than those in the case of eggs incubated at temperatures of 39 C to 40 C may be due to the lower temperature of incubation. It is stated that the observations of KLIGLER and BERNKOPF [this *Bulletin* 1939 v 36 724 1941 v 38 494] and of DAWSON [this *Bulletin* 1942 v 39 80] have been generally confirmed. [Two points are worthy of mention with regard to Dawson's experiments on inoculation of rabies virus directly into the chick embryo brain. He showed that

[March 1944]

in later passage it was found that infection could be produced by injection on the chorio-allantoic membrane into the muscles of the thigh of the embryo and the yolk sac which indicated some adaptation to the chick embryo. Furthermore he found that with one strain of virus chick embryo brain passage led to marked reduction in pathogenicity for rabbit and mouse with production of a mild disease which immunized the inoculated animal. BERKOFF and KLEIGER (this Bulletin 1943, 39-79) also reported a lessened pathogenicity of chick embryo-passaged virus for the rabbit. It might not therefore follow that one could always correlate the anti-embryonic potency of a vaccine with the virus potency of the material used for test. BERKOFF and WACHTIGAL¹ have developed a new method of carrying out complement fixation test in rabies. CASALS and PALACIOS [*J. Exper. Med.* 1941, 74: 409-466] described a method of carrying out complement fixation for virus infections of the central nervous system. The present authors found their procedure for preparing antigen technique satisfactory and they considered it desirable to develop a simpler routine method and they considered it desirable to develop a simpler routine method for complement fixation. At first they obtained good results with Miss Howitt's method of preparing antigen (Howitt, *J. Immunol.* 1937, 33: 235) but they thought that further simplification was possible [CASALS and PALACIOS incidentally have reported unfavourable results with Howitt's method of preparing antigen]. Several other workers have reported contradictory results with rabies virus [GREY and Indian *J. Med. Res.* 1933, 20: 913 and HAYES and MAYFIELD, *J. Infect. Dis.* 1933, 50: 367] using sheep and guinea pig hyperimmune sera respectively. The antigen prepared from fresh unfixed material spread 1 to 2 gm of rabies infected brain material mincing it in a Petri dish at 37°C for 24 hours. Preliminary drying is stated to be important since antigen prepared from fresh unfixed material as found to be anticomplementary. The dried virus material scraped off and stored in rubber stoppered tubes in an ice box and it will keep for nine months. For use the antigen is taken up after grinding in a mortar in physiological saline to give a 2 per cent suspension. It is centrifuged for 15 minutes at 3,000 r.p.m. This type of antigen has been prepared from the brains of rabbits guinea pigs mice and dogs infected with mouse passaged virus from tissue cultures egg passaged virus and local strains of street virus. Controls have included antigens prepared from the brains of guinea pigs mice and dogs infected with equine encephalomyelitis the brains of guinea pigs infected with murine typhus and normal brains of mice guinea pigs rabbit and mouse. The sera used were those of hyperimmunized guinea pigs which had been injected with a 10 per cent suspension of homologous rabies brain vaccine containing 1 per cent formalin. Three courses of immunization were given each consisting of four injections of 5 cc with a four-day interval. One group of guinea pigs was immunized with a culture virus and left a formalin inactivated strain of street virus. The sera are heated to 56°C for 30 minutes. The mixtures are left for 16 to 18 hours in the ice box and then at 18°C to 20°C for complement fixation. Water

Berkoff H & Wachtigal
Ann. Immun. 53, 1943
Dried with 1% formalin
36-8

Compl. m. t. Fixat. n. Test with Sera
Virus P Soc. E. for B. I. & M. d.

bath fixation at 37 C was not sufficiently sensitive. After addition of the haemolytic system the mixtures were incubated for 30 minutes at 37 C. The results showed that the anti rabies immune sera gave specific fixation and failed to react with brain antigens from animals infected with typhus or equine encephalomyelitis or with normal brain antigens. Antisera produced by immunization with a local strain of street virus fixed complement in lower titres than did sera of animals immunized with fixed virus when either fixed virus or street virus antigens were employed. The latter sera gave a positive reaction up to 1:400 with standard antigens prepared from the brain of mice infected with fixed virus. When the brains of dogs infected with the author's strain of street virus were employed to prepare the antigens it was found that sera with a maximum titre of 1:125 failed to react with the antigen whereas positive ults were obtained with the antigen only when sera of a titre of at least 1:250 were employed. This may be due to the lower virus titre of dog brains as compared with say mouse brains. When different parts of the virus infected dog brains were tested for their antigen content considerable differences were observed. The highest titre was always recorded in the medulla. This technique for preparing the rabies antigen for complement fixation was not satisfactory for the preparation of antigen in the case of equine encephalomyelitis as the antigen appears to be destroyed. It is interesting to note that frozen brain material dried *in vacuo* exhibited marked anticomplementary action. The complement fixing antibodies reached their maximum titre in about one week after the 1st vaccine injection decreased to about one eighth of the titre in one month and they were no longer detectable after four months. Virus neutralizing antibodies on the other hand reached a maximum in one month and were still present after four months. [The results recorded by BERNKOPF and NACHTIGAL and CASALS and PALACIOS with rabies virus are interesting and promising but it would appear that confirmation and extension of their observations are necessary before complement fixation can be said to be available for routine laboratory diagnosis.]

ii Symptoms and Diagnosis

The virus infectivity of the saliva of rabid animals was demonstrated in the early part of last century. It is known that excessive salivation is a characteristic feature of rabies in man and PASTEUR, CHAMBERLAND & ROUX and others demonstrated virus in the saliva of human beings with rabies in 1881 during the early basic studies of the disease. Within recent years PALAWANDOW & SEREBENNAJA and PAWAN have demonstrated virus in saliva collected from patients infected with rabies by bites from rabid dogs or vampire bats.

The virus has been recovered from the parotid submaxillary and sublingual glands by PASTEUR, CHAMBERLAND & ROUX and others. SULZIN and HAFORD⁴ report the recovery of the virus of rabies from the saliva of a human patient bitten by a stray dog. The dog was shot and numerous Negri bodies were demonstrated in the *cornu ammonis*. Thirteen persons in all were bitten by this dog and of these eleven in addition to having their wounds cauterized with carbolic acid shortly after exposure to infection received vaccine treatment (Harris vaccine). [In this method of preparing vaccine which has not come

⁴ SULZIN S E & HAFORD C G Concerning the Infectivity of Saliva in Human Rabies. *Am J Int Med* 1943 Aug & 19 No 2 256-67 [19 refs]

into use on a large scale the cords and brains of rabies infected rabbits are frozen with carbon dioxide snow ground up finely while frozen and the material is then dried over sulphuric acid *in vacuo* at -18°C . this treatment is said to produce a 50 per cent reduction in virus infectivity.] Of the eleven patients who underwent treatment two died of rabies. A patient who had refused treatment also died of rabies. A specimen of saliva was collected from one of the patients who had received treatment but who subsequently died of rabies (numerous Negri bodies were found in the *cornu ammonis* on autopsy) the saliva which wasropy and coagulated in the tube was collected 22 days after exposure to infection and within the 24 hours preceding death during a convulsive seizure when salivation was very profuse. This specimen was proved to contain the virus of rabies by the intra cerebral inoculation of mice.

Another sample of virus was collected from the patient who died of rabies (numerous Negri bodies in the *cornu ammonis* on autopsy) after refusing treatment. This saliva was collected about 10 hours before death and 40 days after exposure to infection by swabbing the mouth and throat while the patient was under the influence of a powerful sedative and no virus was demonstrated therein. It is suggested that failure to recover virus from the saliva of rabid human patients reported in the literature may, as in the present case, have been due to collection at a time when there was no copious flow such as is coincident with a convulsion.

Points of interest about the recovery of the virus from the saliva are that mice were used and groups of these were inoculated intracerebrally with either untreated or ether treated material. It is known that several viruses including those of poliomyelitis, influenza, foot and mouth disease and rabies, all resist treatment with ether. In the present instance this agent was employed to eliminate bacteria from the heavily contaminated saliva (shaking with 10 per cent ether and allowing to stand in a refrigerator for 2 hours with subsequent centrifugation, removal and discarding of the supernatant ether layer). However, some of the group of mice inoculated with the untreated saliva developed rabies in the same way as mice of the group inoculated with the ether treated material. Negri bodies being demonstrated in the brains of some of the inoculated mice and transmissible virus being recovered from others. Thus the contaminating micro-organisms did not kill the mice indicating that they were not pathogenic for that species. [This confirms the observations of other investigators that mice inoculated intracerebrally with material infected with bacteria are less likely to succumb to their effects before the virus can take effect than guinea-pigs and rabbits.]

In addition the virus recovered from the saliva was passed twice in mice and then serum neutralization tests were carried out by inoculating groups of 15 mice with mixtures of a 1:1000 dilution of a 20 per cent suspension of the virus in beef infusion broth containing 20 per cent normal horse serum with the following sera. A Serum from the patient who did not receive vaccine treatment collected 39 days after exposure to infection and shortly before death from rabies. B Serum of a patient who received vaccine treatment collected 20 days after the bite and 11 days after the completion of the course of injections. C Pooled serum from two rabbits hyperimmunized with the strain of fixed virus employed for preparing the vaccine. and D Normal human serum. A and D showed no virus neutralizing properties while B and C did.

In conclusion as the saliva of human beings may contain rabies virus it is wise when attending to rabid patients to take reasonable precautions to prevent saliva from coming in contact with wounds abrasions or the mucous membranes of attendants

iii Pathology

PASTEUR and his collaborators and numerous other workers have shown that in street rabies as in experimental rabies the whole cerebrospinal axis is infected with virus and the nerves especially those of the limbs while they are infective are less so and in some cases depending on circumstances are even free from virus. The sympathetic nervous system has probably received less attention than it merits in this connexion. However the ramifications of the sympathetic nerves are widespread and since as has been shown by MANOULIAN⁵ in previous studies the neurones of the sympathetic nervous system are infected with virus it is not difficult to understand why the portions of organs and viscera containing them are infective also. The author here points out that it is easy especially in big dogs to isolate the nerve filaments of the sympathetic nervous system which can be examined histologically for lesions and also be tested for virus infectivity. It has been shown that in the dog infected with street virus there exist in the nerve filaments of the solar plexus definite lesions of the endoneurocytes. These consist of chromatolysis fusion of the neurofibrils into cords (twist) nuclear changes destruction and disappearance of the cytoplasm and nucleus with replacement by a nodule of cells of neoformation. Negri bodies can be demonstrated in the cytoplasm of the endoneurocytes. A diagnosis of rabies can be made by histological examination of the nerve filaments of the sympathetic nervous system and inoculation of suspensions of the nerve filaments into susceptible animals. In three experiments the presence of virus in the nerve filaments of the solar plexus was demonstrated by inoculation of rabbits intracerebrally. These animals developed rabies in 12-14 days and characteristic lesions of the disease were demonstrated at post mortem.

iv Methods of Treatment and Statistics

Prevention of rabies by local treatment of the bites inflicted by rabid animals has occupied the attention of physicians from at least as early as the 1st century A.D. CELSUS DIOSCORIDUS and GALEN advised cauterization with a hot iron and GALEN in addition suggested incision and maintenance of a running ulcer for at least 40 days. Many other methods of cautery have been tried since. In addition to gunpowder which was inserted into the wounds and set alight nitric acid and silver nitrate mentioned by SHAUGHNESSY and ZICHIS⁶ sulphuric acid hydrochloric acid caustic potash antimony chloride and corrosive sublimate have been used. Cautery was carried out even on face and neck wounds and its dreadful effects probably deterred many physicians from applying it.

BABES in 1894 [*Ann Inst Pasteur* v 8 434] studied the effect of thermocautery on wounds in dogs and rabbits contaminated with

⁵ MANOULIAN Y. Démonstration expérimentale de la virulence rabique des filets du plexus solaire et des endoneurocytes. *Ann Inst Pasteur* 1942 Nov-Dec v 68 No 11-12 530-57 2 figs

⁶ SHAUGHNESSY H J & ZICHIS J. Prevention of Experimental Rabies. Treatment of Wounds contaminated by Rabies Virus with Fuming Nitric Acid Soap Solution Sulfanilamide or Tincture of Iodine. *J Amer Med Ass* 1943 Oct 30 v 123 No 9 328-33 [Refs in footnotes]

fixed rabies virus. The number of animals involved in this experiment was small but it appeared that cauterization by this means if applied 25 minutes after infection had little or no effect in arresting the development of the disease. In the opinion of the present authors the published clinical and experimental evidence was insufficient to establish the value of the cauterization of bites by fuming nitric acid in the prevention of rabies yet apparently in America most public health and medical authorities recommend that bites be treated with nitric acid.

Reference is made to the early experiments of CABOT [Medical News 1899 74 329] and POOR 1911 [Collected Studies from the Research Laboratory No 6 Dept of Health New York], and the remarks of ROSENAU [Preventive Medicine and Hygiene 1935 6th ed Appleton Century Co New York p 353] and it is pointed out that it is on the basis of this evidence which is not fully convincing that the method has come into vogue. Cauterization with fuming nitric acid produces many undesirable effects: it is painful, has a destructive action on the tissue leading to bacterial infection and healing is usually slow. Physicians are loathe to apply nitric acid if the wounds are deep and lacerated and on the face since contraction may result and damage to the periosteal and bony tissue may ensue. The authors decided to investigate more thoroughly the effects of nitric acid irritation with soap solution treatment with tincture of iodine and packing with sulphadiazide on wound infected with rabies virus. It is decided that in these experiments guinea pigs and mice should be infected with rabies virus in a manner that would approach very closely the common mode of infection by the bite of the rabid animal. A search was made for a strain of street virus which could infect regularly by the subcutaneous or intramuscular route. Twenty-eight strains were examined and only five of these produced rabies in about 50 per cent of mice and guinea pigs by these routes in first passages. These strains were used only in preliminary experiments. Preference was given to strain 51 a fixed rabies strain which it was found consistently infected mice and guinea pigs by the intramuscular route. Mice were later discarded as unsuitable for these experiments as in preliminary trials many died from the ill effect of treatment applied.

Eleven experiments were carried out on 594 guinea pigs which were treated and there were 79 untreated control guinea pigs. Guinea pigs of 300 to 450 gm were employed and they were kept under observation for 35 days and in some cases up to a year. Two methods of infection for the wounds with virus were employed. Wound 19 mm long and 6 mm deep were made in the muscle at the back of the neck and these were infected with virus which was injected into the muscles to a depth of injection needle or virus was injected into the muscles to a depth of 3 mm and then wounds 12 mm long and 6 mm deep were made. Nitric acid as applied with a glass rod 70 per cent green soap solution by syringe with a hypodermic syringe through a hole in the bottom of a beaker placed over wound to avoid risk to the operator. Iodine as applied with a cotton swab on a small stick.

The wounds treated with nitric acid developed severe burn and scarring and they took 25 days to heal. Soap solution and iodine had no harmful effects. It should be remembered however that tincture of iodine causes discomfort if applied to open wounds and in some instances chemical burns (if it be not freshly made owing to the formation of hydroiodic acid).

The treatment of the wounds was carried out on three groups of guineapigs 30 minutes 2 hours and 6 hours respectively after virus infection. The results may be summarized in the following Table —

	Group 1 30 minute	Group 2 2 hours	Group 3 6 hours
Nitric acid	6/15	65/80	39/60
Soap	67/75	68/80	40/60
Iodine	54/60	12/10	—
Control	9/7	—/80	31/60

Numerator represents survivors of infection with rabies

Denominator represents number of guineapigs employed

B — The results recorded here for Group 3 are those of Table 3 in the text of the paper—there is an error in the total of controls given in the latter as 41/60 instead of 31/60

The authors conclude from these results that while cauterization with fuming nitric acid has a definite value in preventing the development of rabies irrigation with 20 per cent soap solution is just as effective. They state that the results indicated that a slightly better effect was obtained when treatment was applied 30 minutes after infection than after 2 hours and that after 6 hours the effect was less still in the cases in which nitric acid and soap solution were employed (However there would appear to be no appreciable statistical difference between the results after 2 hours and after 30 minutes and it is extremely doubtful whether there was any effect after 6 hours).

It is also stated that since iodine was less effective after 2 hours than after 30 minutes no test was made after 6 hours (the number of guineapigs employed in the 2 hours test was however small).

It is stressed that since it is a matter of considerable difficulty to apply satisfactory local treatment especially to deep or punctured wounds vaccination treatment should be given in addition. Sulphanil amide treatment had no effect in preventing the development of rabies in treated guineapigs.

Since it has been demonstrated that biological products such as therapeutic sera may become contaminated with anaerobic bacteria even if they contain antiseptics ZEHLER⁷ has undertaken an investigation on the effect of antiseptics such as are generally used in rabies vaccines formalin carbolic acid and ether in preventing the growth of sporulating and non sporulating bacteria added to rabies vaccines in which these bactericidal substances are employed such as those of HEMPT (ether and phenol) SEMPLE (phenol) and VAN STOCKUM (formalin). It seemed advisable to make these studies since rabies vaccines have higher lipid and protein concentration than some other biological products and accidental contamination of such vaccines might occur especially in those circumstances in which there is decentralization of rabies services with less perfect laboratory conditions and vaccines may be stored in bulk for some time before distribution into phials for issue and bacterial contamination may occur during transfer.

ZEHLER H. Untersuchungen ueber die Fähigkeit der Selbststerilisierung bei Wutschutzimpfstoffen. *Zent f Bakt I Abt Org* 1943 Jan 20 v 149 No 7/8 429-33

the tissue samples may not have been ideal especially as IERICH and JOHNSON reported higher concentrations of virus in some regions of the brain of humans as compared with others [this *Bulletin* 1940 v 37 616]. It was found that there were considerable variations in the titre of the spinal cords and brains from different sheep 1 400 to 1 30 000 for the cords and 10⁵ to 10⁶ for brains [HABEL examined the virus content of the brains of 23 rabbits two had a titre of 10⁶ three 10⁵ thirteen 10⁴ and five 10³]. This suggests the advisability of mixing the tissues from a number of rabies infected animals in preparing vaccines. HABEL (*vide supra*) doubted whether spinal cords should be included in the material for making vaccines. COVELL and MCGUIRE STEPHENS and LAHIRI [*Indian J Med Res* 1936 v 24 373] reported that vaccines made from the spinal cords of sheep were poor compared with those made from brain tissue. The present author made 40 per cent tissue suspensions in 1 per cent phenol and these were left at 70 to 74 F for three weeks then equal parts of saline and suspension were mixed. These diluted suspensions constituted the vaccines and they proved non infective for rabbits by intracerebral inoculation. They were stored at 40 F for six months and were then tested by the mouse potency test [HABEL this *Bulletin* 1941 v 38 161]. Some irregularities were observed but the brain vaccines were always superior to the cord vaccines which were consistently very poor. It is stressed that while the mouse test is a useful one the application of too strict mathematical interpretations to biological problems has weaknesses thus the loss or survival of a mouse may make a difference of 100 000 mld or greater in the result of a potency test as calculated by the Reed and Muench method. Spinal cord vaccines were of little or no protective value after storage for six months. The results confirm the observations on the direct relationship between the original virus content of the material from which vaccines are made and their immunizing value and strongly suggest the advisability of always testing the potency of virus material used for this purpose.

CLEMENTE⁹ records the results of vaccine treatment by the Hogyes method carried out in the rabies service of the National Institute of Health Madrid during the years 1939-41. 1 296 patients were treated in 1939 1 150 in 1940 and 1 276 in 1941 and there was one fatal case in 1941 a mortality rate for that year of 0 078 per cent or a mortality rate for the three years of 0 0269 per cent. The records for 1928 to 1938 were not available owing to the civil war. The figures for 1901 to 1927 which were published previously by J RAMON Y FERNANDES [*Arch Inst Nacional Hig Alf XIII* 1929-30 v 6 and 7 No 6 p 45] were 15 065 cases treated and 17 deaths a mortality rate of 0 11 per cent but five of these deaths occurred in 1901. In very serious cases of rabies in addition to the special dosage for severe disease for the first ten days it has been customary to inject 5 cc of a Semple vaccine also. The author states that he personally has observed only a few cases of post vaccinal paralysis and all were benign short in duration and followed by complete recovery. He was aware that serious cases of transverse myelitis have occurred as a result of the vaccine treatment but the remarks on the question are diffuse and conspicuous by their vagueness.

CLEMENTE I Tratamiento antirrábico Método d Hogyes Sus fundamentos y sus ventajas Resultados obtenidos Nuestra estadística Reprinted from *Rev Sanidad e Hig P bl a* 1943 May-June v 17 No 3 20 pp

to as the Brazzaville jeune chien strain maintained one is the Pasteur (Paris) strain and the CRUVEILHIER and VIALA¹¹ report that during the ear 1917 588 persons presented themselves for treatment with vaccine at the Pasteur Institut Paris in 214 of these treatment as considered necessary and thirteen belonged to Category C and one to Category A There were 185 deep bites and 29 superficial 136 were bites without the interposition of clothing There were 15 head bites 130 of the upper limbs 3 of the trunk and 66 on the lower limbs 133 patients were treated within the first four days after infection 54 between the 5th and 14th day 16 between the 15th and 21st day and nine later than this There were no deaths and no cases of post vaccinal paralysis

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carbolized vaccine for do HERBLER this Bill in 1931 28 747
had already shown that fixed virus recovered from sheep inoculated
with rabbit fixed vaccine was satisfactory JA OTOT and LE
ROUX this Bill in 1938 3 165 on de ed the use of horses
and al es for the production of fixed virus material for vaccine pre-
paration The had found that a do inoculated with rabbit fixed
rabbit virus yielded a quantity of virus material for the preparation of
a vaccine for domestic equine to that obtained from 5 to 10 rabbits A
portion of 300 kgm yielded 500 gm of virus material (nervous tissue)
and a half of 150 kgm 350 gm equivalent to the virus infected nervous
tissue of five to six Calves were preferred to horses because
the symptom were considerably paralytic as distinct from those seen in
horses in which he cited on a observed on occasion First passage

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virus material was considered to be better than that recovered in later passages for vaccine preparation. Jacotot and Le Roux used 6 per cent formalin to prepare this vaccine for immunity tests in guinea-pigs but only a limited number of observations were made. The present author has found the calf to be satisfactory for the production of fixed rabies virus material (brain tissue) for the preparation of vaccine for use in dogs. The limiting infective dilution for rabbits by intracerebral inoculation of the suspension of brain tissue from an intracerebrally inoculated calf was stated to be 1:400 000. Carbolic acid was used instead of the formalin as employed in Jacotot and Le Roux experiments. A 20 per cent suspension of virus infected brain tissue was used and 1 per cent phenol in 50 per cent glycerine. The preventive vaccine treatment of dogs consisted in giving three injections subcutaneously into the thigh of 5 cc at six day intervals. The first vaccine had been kept at 37 C for 24 hours, the second vaccine at 22 C for 24 hours and the third vaccine at 5 C for the same period.

A test was made to determine the efficacy of the vaccine in protecting dogs against infection with street virus by the intramuscular route. It is stated that the result of this test demonstrated clearly that the fixed rabbit virus passed in the calf preserved a vaccinating power against street virus and that this justified the production of the vaccine on a large scale. [In the tests however there were three vaccinated dogs and three untreated control dogs. None of the vaccinated dogs when injected with street virus one month later developed rabies and of the controls one survived and two died of rabies. It has frequently been stressed in the literature on rabies vaccination although it should be obvious that such results have no statistical value and that groups of at least 20 to 30 dogs should be employed.] During 1941 and 1942 2 000 dogs were vaccinated in the manner described and there were no ill effects from the vaccination except a few small local abscesses at the site of inoculation and four cases of paresis of the hindquarters. The latter are reported to have been cured by injections of strychnine. The only reason for the author's belief that the vaccine was satisfactory for protecting dogs in practice against rabies appears to be that there were many cases of rabies in dogs before vaccination was introduced and there were no cases of rabies among the 2 000 vaccinated.

vi Miscellaneous

JOHNSON¹³ has written an article on rabies. This is the second treatise on rabies which has emanated from America within the last two years. The other was by WEBSTER and it was reviewed a year ago [this *Bulletin* 1943 v 40 269]. The method of approach to the subject has been different in each case and the present summary will no doubt appeal more strongly to the student of virus diseases than its predecessor since it embodies more detailed information on the virus itself, on the general pathology of rabies and on the laboratory diagnosis of the disease. The treatise is somewhat longer than the pagination in the reference given here would suggest since in pages 630 (1) to 630 (17) such additional practical questions as Laboratory Diagnosis of Rabies, Prevention of Rabies after Exposure, Reactions to Rabies Vaccine Treatment and Control of Rabies are discussed. The summary of information should be very useful and while it is not

¹³ JOHNSON H V. Rabies. Reprinted from *Oxford Loose Leaf Medicine*. New York 1943. Chap xxvi 599-630 5 figs (4 on coloured pl.) [Bibliography.]

by any means exhaustive there are few essential points to which some reference has not been made. The personal views of the author while they may not all meet with general acceptance by experts on the subject are not unduly forced and in most cases they are not widely at variance with current views on experimental facts and interpretations. However there are many who would question his statement that the

rabies virus is not strictly neurotropic and who would submit other explanations for the infectivity of the submaxillary glands and some other organs and tissues. BEITARELLI showed that if the nerve filaments to the submaxillary gland are sectioned during the incubative stages of rabies the glandular tissue does not become virulent and the work of Manouelian and others would strongly suggest that the virus infectivity of the submaxillary gland and some other organs and viscera could be explained by the presence of the virus in the nerve ganglia filaments and their endoneurocytes associated therewith. The histopathological changes in the submaxillary gland referred to by the present author as indicating that the virus has a special affinity for the mucus secreting cells may be secondary effects to the nervous involvement. The author has failed apparently to recover the virus from the circulating blood but on occasion other investigators have done so and the strain of virus and species of infected animal may be factors influencing the issue of such researches. Many physicians would no doubt question the advisability of the continued use of fuming nitric acid cauterization for the local treatment of bites as recommended by the author and by most public health and medical authorities in America. It has many disadvantages which are discussed in section IV of this Review of Recent Articles on Rabies. There is some evidence that thorough syringing with 70 per cent green soap solution would be equally effective. [It is obvious that in the treatment of rabies in human beings it would be inhuman to suggest experimentation on a scale to produce sufficient statistical evidence as to the effects of the following—(1) Non-treatment of bitten individuals (2) Treatment of bitten persons by cauterization or other local treatment (3) Treatment by vaccination alone and (4) Treatment by methods (2) and (3) combined. In the present state of our knowledge it would be unwise to withhold vaccine treatment in those cases in which its use is most generally recommended and depend on the problematic effects of cauterization or other local treatment. Thorough irrigation of the wounds with soap solution might be a useful adjunct to vaccine treatment. The author's conclusion that since there are records of large series of cases of exposure to rabid animal bite treated by vaccination and actual cautery or other local treatment with a very low mortality rate, too much reliance should not be placed on post-exposure vaccine treatment is surely neither logical nor justifiable.] For the demonstration of Negri bodies in the laboratory diagnosis of rabies the author like many other American workers favors impregnation preparations stained by Seller's method first described in 1907 [Mer J Pub Health 1927 v 17 1080]. There are still however quite a number of technicians who place greater reliance on paraffin sections and Mann's eosin-methylene blue stain. The delay in diagnosis by use of the second method is insignificant.

The white mouse has become increasingly popular as a test animal in those cases in which a microscopical diagnosis has not been possible or has given an uncertain result and the present author has found it extremely useful.

There still appears to be a lack of efficient legislation in America for enforcing dog control and as is pointed out here this is very necessary and should be the responsibility of the Livestock Sanitary Association acting under the Federal Bureau of Animal Industry.

The American workers JOHANSON & LEACH and WEBSTER & CASALS have shown that it is possible to give a reasonably good protection to dogs by vaccination with a relatively small dose of a non infective preparation of fixed virus. Vaccination of dogs no doubt can be a useful adjunct to the dog control regulations and might be made compulsory in infected areas but vaccinated dogs should not be allowed special privileges.

Ian A Galloway

MALARIA

WOLMAN M Field's Stain [Correspondence] *Trans Roy Soc Trop Med & Hyg* 1943 May 36 No 6 363-4

The author was often unable to obtain with Field's stain [this *Bulletin* 1942 v 39 17] the purple staining of the chromatin of malaria parasites and found that the spirochaetes of relapsing fever were often understained and almost invisible. After experiments to find the best staining agents in the eosin and methylene azur groups he replaced eosin by erythrosin and azur I by methylene blue. His solutions are as follows —

Solution A—	Grammes	Solution B—	Grammes
Unna's polychrome methylene blue		Erythrosin	
Disodium hydrogen phosphate (anhydrous)	5.0	Disodium hydrogen phosphate (anhydrous)	1.0
Potassium dihydrogen phosphate (anhydrous)	5.0	Potassium dihydrogen phosphate (anhydrous)	5.0
Distilled water	625	Distilled water	625
	500.0		500.0

These solutions should be filtered and are then ready for immediate use. The technique of staining is: A blood drop not too thick, freshly dried —

- 1 Stained for 1 second in the A solution
- 2 Rinsed in tap water for 2 to 3 seconds
- 3 Stained for 1 second in B solution and
- 4 Rinsed again and dried

This modified staining method has proved to be very satisfactory in our hands. The time of staining is about 5 seconds and the Romanowsky effect with purple staining of the chromatin as well as a clear blue staining of spirochaetes when present is invariably obtained.

Charles Wilcocks

ANGELINI G Ueber die Anwesenheit von *Plasmodium falciparum* in Erythroblasten [The Presence of *Plasmodium falciparum* in Erythroblasts] *Deut Tropenmed Ztschr* 1943 May 1 v 47 No 9 226-8

The question as to whether the parasites of malignant tertian malaria can invade immature red blood corpuscles particularly the basophile normoblasts which are devoid of any traces of haemoglobin has

remained unanswered in spite of the fact that certain observers claim to have seen parasites within normoblasts of one type or another. The author who has examined sternal blood in cases of malarial infection has not previously seen parasites within the normoblasts. In one case however in which blood was withdrawn by puncture just at the moment of death from a very heavy infection parasites were seen in normoblasts but never in the basophile forms. In the heart blood fairly numerous normoblasts were present. 44 per cent were polychromatic and 56 per cent orthochromatic. Of the latter 7 per cent were infected with malarial parasites while of the former very few were infected. In the bone marrow 8 per cent of the normoblasts were basophile, 30 per cent polychromatic and 62 per cent orthochromatic. Of the polychromatic normoblasts 1 per cent were infected and of the orthochromatic 2 per cent. None of the basophile normoblasts was infected. The type of parasite present was the young ring or early developmental form. The author considers the invasion of immature red corpuscles by malarial parasites to be of rare occurrence and then only in very heavy infections. C. M. HENCO

TOMMA O. P. Di un caso di terzana mista con due parassiti di *Plasmodium* mista in una stessa amazia. A Case of Mixed Tertian Malaria with Two *P. malar* Parasites in a Single Red Cell. *Boll. d. Soc. Italiana d. Med. e Inf. e Trop.* (Eritrea) Asmara 1943 v. 2 No. 1 7-11. English summary (6 lines)

The author describes a case of mixed *P. falciparum* and *P. malar* infection. In some of the red cells two *P. malar* parasites were seen. A study of the appearances of the parasite in this dual infection of red cells led to the conclusion that direct binary fission of the parasite within the cell had taken place. Norman H. HILL

DE MEILLON B. Remarks on the Entomology of Malaria in the Tropics and Sub-Tropics of Africa. Reprinted from *Primeiro Congresso Med. d. Lourenço Marques* 1935 Sept. 10 3 63-74

The author has produced a compact readable account of the entomologist's view of the malaria problem of Africa south of the Sahara. The paper is not one which can be further summarized. The author is altogether too modest in describing it as "remarks." P. A. BERTON

RENN C. E. Emergent Vegetation Mechanical Properties of the Water Surface and Distribution of Anopheles Larvae. *J. National Malaria Soc.* Tallahassee Fla. 1943 v. 2 No. 1 47-52 3 figs.

The author discusses the distribution of Anopheles larvae among stems of aquatic grasses and analyses the surface forces involved by using a simple mechanical model.

It is well known that larvae of *Anopheles quadrimaculatus* and many other species tend to be common among stems of aquatic grasses (emergent vegetation) and rare in open water or where margins are clear. The emergent plants provide conditions which are to the advantage of the larvae for several reasons. The author limits himself to the study of surface forces. He does not consider to what extent the location of larvae may also depend on the place where the parent female deposited the eggs.

A simple mechanical model can be made from a large pan of water in which glass rods are set vertically. If the rods are waxed & depressed negative meniscus forms round them like that round a grass stem which has not been long in water. If the rods are coated with agar the meniscus is raised or positive as it is round a natural object which has become coated with microorganisms.

Among these rods arranged in various patterns larvae may be liberated. They tend to group themselves on positive menisci with their tails close to the stems. Now it can easily be seen that the unwettable parts of the larva (palmate hairs spiracular plate etc) are surrounded by negative menisci but that there is a positive meniscus under the posterior edge of the spiracular plate which is raised. Owing to surface forces this positive meniscus tends to draw the larva's tail towards the similar meniscus on the glass rods or stems of plants. This also can be demonstrated with small floating models. *P A Buñton*

GOODWIN M H Jr & LUYERT L G. Methods used for investigating certain Hydrologic Problems related to Malaria. *J National Malaria Soc* Tallahassee Fla 1943 v 2 No 1 63-72 5 figs [21 refs]

Discusses relation of breeding of *A. quadrimaculatus* in Georgia U S A to local geology

HERMITTE L C D. Diagnosis of Pernicious Malaria. [Correspondence] *Trans Roy Soc Trop Med & Hyg* 1943 Sept v 37 No 2 166-7

Hermitte referring to the paper on pernicious malaria (this Bulletin 1943 v 40 878) agrees with JINDSAY's views and thinks that they are valid for any place where *P. falciparum* is endemic but questions the statement that the microscope has little place in the diagnosis of pernicious malaria. He advises the examination of films obtained by sternal or liver puncture as well as blood films if all are negative. Subtertian malaria can be excluded while malaria in the presence of other disease will not escape diagnosis. [Nevertheless microscopical diagnosis depends on good staining technique. During military operations facilities may not always be such that complete reliance can be placed upon examination of stained films. Clinical experience should not be rejected.] *J I Corson*

WILCKENS H. Frühlingsmalaria. Klinische Ueberlegungen zur Frage des Reticuloendothelstadiums der Malaria plasmodien. [Spring Malaria. Clinical Reflections on the Question of the Reticuloendothelial Stage of Malaria Parasites.] *Klin Woch* 1943 June 12 v 22 No 24/25 417-18

Seventy two cases of benign tertian malaria were observed in a German field hospital near Lake Ladoga (Russia) during April and May 1941. The patients (soldiers) had not previously been abroad except that many of them had been in France but all were in the Lake Ladoga district in the autumn of 1941 and had remained there throughout the winter. They had received no medical prophylaxis in 1941 and had had no fever since the summer of that year. Hibernating mosquitoes could not be regarded as effective carriers of sporozoites and a new

invasion of infective mosquitoes could not have occurred because ice and snow were still on the ground when the illnesses began. The author therefore thinks that the soldiers must have been infected locally in the autumn of 1941 and that the plasmodia had remained throughout the winter without development either in the erythrocytes or more probably in the cell of the reticulo-endothelial system. The long period of primary latency or incubation period might have been caused by the climate. The author regards these observations as clinical evidence in support of the view that an exoerythrocytic stage exists such as was shown to occur in birds by KIKUTH & MUDROW [*this Bulletin* 1940 v 37 671 1942 v 39 24 399] and of course originally by JAMES and TATE *ibid* 1937 v 34 589] J. F. Corson

SHONE S. & PASMORE R. Pneumonitis associated with Autohaemagglutination. *Lancet* 1943 Oct 3 445-6

Autohaemagglutination visible to the naked eye within 10 minutes of taking the blood sample was observed in every one of a group of 54 Indian soldiers admitted to a hospital in the Middle East for varying degrees of inflammatory involvement of the respiratory tract. The symptoms ranged from those of laryngitis with slight fever to fibrile pneumonitis with patchy consolidation of the lungs as shown in nine cases by X-ray examination. In the severe cases there was high intermittent fever with abundant mucopurulent sputum and dyspnoea. In one there was leucocytosis. In one case the white corpuscles were 61,000. No special organism could be found in the cases in which sputum, blood or lung puncture material was investigated. Apart from this group there was no special incidence of respiratory infections among the troops in the station. The cases were seen in the cool season when nights were cold and the days warm, sunny and dry. The observations were made at room temperature which is stated to have been at or about body temperature. The patients' serum agglutinated the red corpuscles of rabbits and sheep. On recovery agglutination ceased to occur.

All the patients had recently been stationed in a highly malarious camp near Delhi. 20 had enlarged spleens and in nine malarial parasites were found.

Control tests were negative in 60 healthy sepoy soldiers in 49 aseptic surgical patients and in 48 rifle medical cases. They were positive in 70 of 37 chronic malaria cases, in 21 of 31 cases of tuberculosis, in two of 41 acute and chronic respiratory infections, in two of eight cases of infective hepatitis and in the only case of nodular leprosy which was tested. Among 30 severe battle casualties there were seven positive reactions, all in patients with chronic epilepsy.

The association with malaria and the possible analogy with the pneumonitis occurring in Pfeiffer's infections are discussed.

[The investigation supplies fresh evidence that malaria causes a condition of low resistance to respiratory infections. Damage to the reticulo-endothelial cell may be an important factor in the production of the haemagglutinins. Autohaemagglutination is hardly the right name for the reaction. The evidence suggests that the respiratory infection may be a complication or sequela of malaria.]

Joh : H. D. Mea

TRUJILLO GUTIERREZ C El paludismo Estudio clínico [Clinical Study of Malaria] *Rev. Facul. de Med. Bogota* 1943 Apr v 11 No 10 585-611

This is an excellent clinical lecture on malaria by a physician of much experience in which the symptomatology and differential diagnosis are very fully treated
Norman White

HOWIE J W & MURRAY LYON R M Tanret Reaction in Subtertian Malaria *Lancet* 1943 Sept 11 317-20 [12 refs]

Hitherto the practical application of the Tanret reaction has been largely confined to the control of prophylactic quinine administration. The valuable observations here recorded extend its sphere of usefulness. They concern 100 consecutive patients admitted to hospital in Southern Nigeria suffering from subtertian malaria and 53 healthy controls all were British soldiers. The usual treatment of the acute attack was 10 grains of quinine bisulphate in solution thrice daily for seven days thereafter 10 grains daily for three or four days and then 5 grains a day. Precautions were taken to see that the drug was actually swallowed. Tanret's test was applied to every specimen of urine passed by these patients. The urine of 88 patients showed positive reactions consistently throughout the treatment of the acute attack all these patients made rapid recoveries. In seven men no quinine was detected in the urine they were seriously ill until they were given intravenous quinine. Thereafter positive Tanret reactions were obtained and recovery was rapid. Five patients gave positive reactions at irregular intervals during the acute attack they recovered slowly and showed negative reactions during convalescence. The 53 healthy soldiers were each given 5 grains of quinine in solution. Their urine was examined 15, 30 and 60 minutes after taking the drug and then hourly until a strongly positive Tanret reaction was obtained. A final test was made 24 hours after the dose of quinine. All 53 men showed strongly positive reactions within five hours of taking quinine all reactions were negative after 24 hours. The time of appearance and the duration of positive reactions varied. 5 tests were positive at 30 minutes 15 at 60 minutes and the remaining 33 between two and five hours. Five of the positives became negative within 10 hours others were not examined with this regard. Clinical notes are given of the twelve patients who showed negative or irregularly positive reactions during the treatment of the acute attack. In one patient an extreme case the Tanret reaction remained negative throughout the 24 hours following the intravenous injection of 10 grains of quinine. Doses of quinine by mouth were increased in this case to 60 grains a day for one day only and then only were Tanret reactions positive throughout 24 hours. This patient had suffered from repeated attacks of malaria. In other cases intravenous injections resulted in positive reactions and thereafter quinine given by mouth produced positive reactions in doses which before the injection had consistently given negative reactions. The authors discuss the possible association between some abnormality of quinine metabolism and blackwater fever. They suggest that quinine dosage in treatment and prophylaxis should be controlled and adjusted for each individual by the Tanret test. If this were done less might be heard of quinine resistant strains of malaria
Norman White

BRAUN H CZERTOK J & HORNBLIETH W An Unusual Case of Quinine Idiosyncrasy *Trans R & So Trop Med & Hyg* 1943 Dec 1 7 No 3 221-4

An interesting case of primary hypersensitiveness to quinine is described. The ingestion of a very small dose (0.1 gm of quinine hydrochloride) produced severe symptoms prominent among which were rigor hyperpyrexia diarrhoea abdominal pain vomiting and headache. The rigor and associated symptoms closely simulated those of an attack of malaria a disease from which the patient had never suffered. A patch test with quinine ointment gave a positive reaction.

Vort an Whit

LOUGHLIN F H BENNETT R H SANIORA E & MATTECCI S Clinical Toxicity of Atabrine Dihydrochloride (Quinacrine Hydrochloride U.S.P. XII) A Controlled Comparative Study of the Toxicity of American and of Foreign Atabrine when administered in Doses commonly employed in the Prophylaxis of Malaria *War Medicine* Chicago 1943 Sept 1 4 No 3 272-9

This describes an investigation to study whether American mepacrine (atabrine) is more toxic than foreign mepacrine as had been claimed on the basis of certain preliminary work. The subjects were 80 patients with tuberculosis and 64 prisoners in a penitentiary. The material were American mepacrine foreign mepacrine A (made from German materials by German processes used for the patients) foreign mepacrine B (made from German materials by American processes used for the prisoners) and a placebo made to look like mepacrine. The dosage was either 0.1 gm four times a week or 0.2 gm twice a week. At each institution the subjects were divided into four groups which were arranged so that each group took the placebo for three weeks the American mepacrine for three weeks and one of the foreign mepacrines for three weeks the order being varied in the different groups.

Severe symptom included severe nausea vomiting abdominal cramps and diarrhoea. Some of these occurred among the tuberculous patient while taking the placebo and they were probably due to the tuberculosis. Minor symptom included pain in the chest and poor appetite. The incidence of indisposition due to gastro-intestinal symptoms after the placebo and after American and foreign mepacrines is shown in the accompanying table.

As a psychological check the prisoners were asked leading questions about symptoms which could hardly be caused by mepacrine and in response 41 complained of ringing in the ears 7 had pain in the arms and 14 were restless. The incidence of all symptoms diminished as the experiment proceeded. Since the symptoms among the tuberculous patients (corrected for those probably due to tuberculosis) were not significantly more frequent than those among the healthy prisoners it is concluded that troops living under conditions of physical hardship should not be more liable to toxic reactions from mepacrine than persons living under more normal conditions. The symptoms as a whole were transient and usually mild and according to a total weekly dosage of 0.4 gm mepacrine dihydrochloride should cause no disability and only minor and infrequent indisposition.

[This work proves (1) that American mepacrine (atabrine) is no more toxic than the mepacrine manufactured from German materials and

(2) that normally the prophylactic administration of mepacrine does not cause important toxic reactions. However it sheds no light on the problem of why mepacrine occasionally causes acute severe abdominal symptoms in a high proportion of the men taking it.]

Indisposition due to Nausea Vomiting and Diarrhoea

	S3 Tuberculous patients		C4 Prisoners		Combined percent age of symptom days
	Mean days	Percent age of symptom days	Mean days	Percent age of symptom days	
Placebo	~ 352	2.42	1548	0.97	1.74
Foreign mepacrine— A B	1533	3.92	1092	4.12	} 4.00
American mepacrine	1470	7.44	1092	1.56	
All mepacrine	3003	4.67	~ 184	2.84	3.79
					3.89

[The results are given throughout in terms of symptoms and of symptom days and it is impossible to determine how many of the subjects were affected by these toxic manifestations.]

AZIZ W. A Simple Device for destroying Adult Mosquitoes House-Flies and other Household Pests by the Use of a Flame Thrower [Correspondence] *Trans Roy Soc Trop Med & Hyg* 1943 May 36 No 6 364-5

If the spray from an ordinary flit gun be ignited by means of a burning wick 2-2½ inches in front of the spray nozzle a tongue of flame 1½-2 feet long and 6-8 inches wide is produced at each stroke. This is useful for killing mosquitoes and other pests. The wick is led from the oil container through a tube soldered on to the container petroleum insecticides or light fuel oil may be used.

Charles H. Wilcocks

TATTERSFIELD I. & POTTER C. Biological Methods of determining the Insecticidal Values of Pyrethrum Preparations (particularly Extracts in Heavy Oil) *Ann Applied Biol* 1943 Nov 30 No 3 259-79 11 figs

PARSONS E. A. & GREEN A. A Film Technique for the Biological Evaluation of Pyrethrum in Oil Insecticides for Use against Stored Product Insects in Warehouses *Ann Applied Biol* 1943 Nov 30 No 3 279-92 5 figs [13 refs]

MARTIN J T The Preparation of a Standard Pyrethrum Extract in Heavy Mineral Oil with Observations on the Relative Toxicities of the Pyrethrins in Oil and Aqueous Media *Appl & Biol* 1943 Nov 30 No 3 293-300 1 fig [1 ref]

NICOLE J E Malaria in Neuro-Syphilis 1923-43. *J Med Sci* 1943 Jul-Oct 89 Nos 3 6-77 351-9 7 charts

WALETZKY E & BROWN H W Studies on the Mode of Action of Quinine in Avian Malaria *J National Malaria Soc* Tallahassee Fla 1943 2 No 1 53-62 2 figs

The treatment of *P. lophurae* infections in ducks with quinine has been used to investigate the possibility that a metabolic product of the substance is the active agent in malaria. The drug was administered intravenously in large doses when young trophozoites predominated in the blood and the effects of different treatments were judged by their influence on the reproductive rates of the parasites as compared with those in control. Estimation of quinine in the blood were also made.

The duration of the plasmodicidal effect of quinine was determined by giving birds a single dose of the drug followed by inoculation with infected blood at various intervals of time. By comparison with the reproductive rate in control and treated birds quinine was shown to exercise an effect for at least 12 hours. The level of quinine in the blood fell rapidly and the amount present was very small after a period of 8 hours. High quinine level in the blood of the host corresponded with low rate of reproduction and vice versa. In spite of the high correlation between various factors the possibility that a metabolic product of quinine was the active agent could not be excluded.

Exposure of parasites to the action of quinine for 4 hours in the fox host prevented reproduction in fresh birds. In another experiment quinine was given to a normal bird which was infected after a definite time. At various intervals after infection other normal birds were inoculated with its blood. The results showed that exposure to quinine for 2 or 3 hours in vivo greatly depressed reproduction.

Infected blood was incubated at 36°C in the presence and absence of quinine. On inoculation to fresh foxes the reproductive rates of the parasites were determined. It was found that a concentration of 50-100 times more quinine was required *in vitro* than *in vivo* to affect the reproductive rates.

No definite evidence was obtained from these experiments to exclude a metabolic product of quinine as the active agent in the malaria infection studied. *J D Fulton*

HEWITT R I & RICHARDSON A P The Direct Plasmodicidal Effect of Quinine, Atabrine and Plasmochin on *Plasmodium lophurae*. *J Infect Dis* 1943 July-Aug 73 No 1 1-11 3 charts & 36 coloured figs on 1 pl [21 refs]

In this paper the general and specific changes are described which occur in the parasites after administration of effective drugs to ducks infected with *P. lophurae*. The results of such treatment have been

measured quantitatively by inoculating infected blood from drug treated donors into fresh hosts and observing the course of the subsequent infection. Support is afforded for the view that the drugs employed had a direct action on the parasites. The quantitative methods employed are of value in assessing the effectiveness of new compounds.

Degenerative changes in *P. lophurae* as a result of drug treatment depend on a number of factors such as the nature of the drug, dosage, frequency and mode of administration. Pentamidine given orally produced no morphological changes in *P. lophurae* whereas much smaller doses given intramuscularly had a marked effect. Emphasis has been laid on the nature of the changes produced in the parasite by doses of various drugs causing a definite effect and on the extent to which these changes control the nature of the resulting infection in fresh hosts.

The morphological changes produced in *P. lophurae* by oral administration of quinine, plasmoquine and atebirin to the host at the peak of infection are described in detail and illustrated along with those caused by pentamidine. The changes are brought about most rapidly by plasmoquine and most slowly by atebirin. From the nature of the changes seen in stained films it was possible to name the drug used in treatment. Other drugs cause changes corresponding with their chemical constitution in relation to that of the three standard types of antimalarial.

Morphological changes in the parasites caused by incubation of infected blood with various drugs were also investigated. The *in vivo* and *in vitro* changes produced by plasmoquine were very similar but degenerative changes were not produced by quinine or atebirin *in vitro* under the conditions employed.

After treatment of donor birds with quinine, atebirin or plasmoquine it was found that the degenerate forms produced persisted for some days in the blood of the recipient birds. Infections produced by the blood of plasmoquine treated donors deviated most from those in the controls. As already stated the evidence obtained suggests that quinine, atebirin and plasmoquine attack *P. lophurae* directly and also that plasmoquine acts unchanged. The mechanism of the action of these drugs is not yet clear but there is no evidence that they stimulate phagocytosis or other immune reactions.

J. D. Fullon

PESSÔA S. B. & BARRETO M. P. Notas sobre a ação antimalárica de algumas substâncias. VII. Falsas quininas: lupanina clorofilato de sódio e azul da Prússia. [Antimalarial Action of certain Substances.] *Acta Med.* Rio de Janeiro 1943 Apr-May v 11 Nos 4-5 63-7. English summary.

In *P. cathemerium* infection of canaries, no antimalarial action was found with the following: total extract of *Strychnos brasiliensis* and *S. macracantha*, the alkaloid lupanine from *Lupinus albus*, sodium chlorophyllate and Prussian blue.

Charles Wilcocks

MANWELL R. E. & EDGETT RUTH. The Relative Importance of certain Factors in the Low Temperature Preservation of Malaria Parasites. *Amer. J. Trop. Med.* 1943 Sept v 23 No 5 551-7. 5 figs on 1 pl.

The experiments reported on the low temperature preservation of malaria parasites by Manwell [this *Bulletin* 1943 v 40 756] have been

continued with the object of finding the best conditions and technique to be employed. The blood of ducks infected with *P. lophurae* was used. The value of various modifications in technique was assessed by the nature of the infection resulting in ducks when inoculated with the preserved samples as well as by examination of stained slides. It was found advantageous to employ tubes thinner than those used in the earlier experiment and by this means a strain of human toxoplasma could be preserved which was not previously possible. Mechanical rotation of the blood tubes while freezing was preferable to the manual method. The temperature at which freezing was carried out was less important than that of storage and when frozen at a temperature as high as -10°C parasites have remained viable. The best temperature for storage has not yet been determined. Gradual deterioration of parasites has not been noted when they are stored at temperature between -75°C and -50°C and they have remained viable for at least 244 days. The degree of infection of the stored blood exerted little effect except that if infection was intense all the erythrocytes appeared to be more fragile.

J. D. Fulton

RICHTENOW, E. & MUDROW, Lillie. Der Entwicklungsgang von *Plasmodium praecox* im Vögelkörper [Development of *Plasmodium praecox* in Birds]. *Deut. Tropenmed. Wschr.* 1943 June 1, v. 47, No. 12, 289-99, 3 figs.

The authors have investigated the exoerythrocytic cycle of development of *Plasmodium praecox* following the injection of sporozoites into the tissues of canaries. The majority of the injected sporozoites are destroyed, only a small number which have entered cells of the reticulo-endothelial system being successful in proceeding to further development. A successful sporozoite within the cell becomes as other observers have noted a unimaculate rounded body which for four hours shows no increase in size. It then commences to grow, till at the end of 16 hours it has reached the stage of the first nuclear division. Four hours later the two daughter nuclei divide and again four hours later the product of this division also divide. Further nuclear divisions occur a period of about four hours intervening after each series of divisions. Generally there are six such divisions before segmentation into merozoites occurs, the whole development from the sporozoite to the mature schizont occupying 36 hours. Theoretically there should be 64 merozoites, but as some nuclei fail to divide the actual number is between 32 and 64. These merozoites enter cells of the reticulo-endothelial system and again produce schizonts and merozoites as before. The third cycle commences, but instead of all the schizonts developing in the same way, in some the nuclear division proceeds further to produce 128 or more instead of the 64 nuclei. The merozoites produced by these schizonts with the larger number of nuclei are smaller than the others. They possess little cytoplasm and smaller nuclei. These small merozoites are designated micromerozoites in contradistinction to the larger macromerozoites, the schizonts producing them being termed microschizonts and macroschizonts respectively. Occasionally a macroschizont will appear during the second cycle, but this is unusual. The micromerozoites are in size and structure like those which result from the schizonts developed within the red blood corpuscles and they are destined to enter the red blood corpuscles to commence the erythrocytic phase of development.

The macromerozoites on the other hand do not invade the red blood corpuscles. They only enter cells of the reticulo-endothelial system. In the fourth endothelial cycle most of the schizonts are microschizonts while in the fifth cycle practically all are of this type. After this no further endothelial development can be detected. At the end of the third endothelial cycle the first micromerozoites to be produced invade the red blood corpuscles and commence the erythrocytic infection which can first be detected 114 hours after the injection of sporozoites. Most of these erythrocytic forms develop into schizonts at very much the same rate as did the endothelial forms. Sixteen hours are needed for development to the first nuclear division and four hours for each subsequent division. A schizont with 16 nuclei will have developed in 28 hours others with up to 24 nuclei will have developed within 32 hours. It is noteworthy that the earliest produced micromerozoites after entering the red blood corpuscles do not all develop into schizonts. As many as 30 per cent develop into gametocytes so that it is clear that some of the micromerozoites are already sexually differentiated when they invade the red blood corpuscles. The first batch of micromerozoites which enter the red blood corpuscles reach maturity at the same time so that there is a high degree of synchronism. With the advent of an increasing number of micromerozoites this synchronism is rapidly lost so that the established blood infection is characterized as is well recognized by a complete lack of synchronism. The authors are careful to point out that the data they have given in this their preliminary communication apply only to the particular strain of *P. praecox* they have discussed. They promise to publish a complete and detailed account of their work at some future date. [For observations on *P. gallinaceum* see this *Bulletin* 1943 v. 40 116]

C. M. Henyon

TRYPANOSOMIASIS

MARTINS A. V. VRSIANI V. TUPINAMBA A. A. SOBRINHO A. T. TORRES A. LASMAR J. E. & TEIXEIRA A. A. Sobre 25 casos agudos de molestia de Chagas observados em Minas Gerais [Twenty five Cases of Chagas's Disease seen in Minas Geraes] *Mem. Inst. Biol. Equel. Dias* Belo Horizonte 1939 & 1940 v. 3 & 4 5-51 20 figs on pls

Between December 1939 and December 1941 the authors have observed 25 cases of Chagas's disease in the State of Minas Geraes 20 of them in the Municipality of Bambui which has a well equipped hospital and is central for patients to apply for treatment three in the Municipality of Luz adjacent to Bambui and one each in Rio Paranaíba in the west of the State and Grao Mogol in the north. The character or at least the severity of the disease varies in different parts of the State. Thus towards the south west and near the frontier with São Paulo it is more serious and acute and more often diagnosed in other parts as along the banks of the Rio das Velhas in the centre of the State not a single acute case was met with in the two years although more than 20 per cent of the people were found to be harbouring *T. cruzi*. [This is a high figure an account of the survey is to be published later]

Of the 25 cases recorded in detail in this article 18 presented the initial Romaniasion six had generalized oedema more marked on the face. In 20 the trypanosome was seen when the blood was first examined in another it was found a fortnight later on re-examination two were negative to this but were proved by xenodiagnosis. One a child of four years died and leishmanial forms were seen in large numbers in sections of the myocardium in one other the diagnosis seems to have been made on clinical appearances only. The article is well illustrated.

H Harold Scott

MAZZOTTI L & LEÓN L A Infeccion experimental por *Trypanosoma cruzi* de *Triatoma carrioni* del Ecuador [Experimental Infection of *T. carrioni* with *Trypanosoma cruzi*] *Medicina Mexica* 1942 v 22 No 411 191-3 1 fig [Summary taken from *Rev Applied Entom Ser B* 1943 Nov v 31 Pt 11 213]

Of 19 examples of *Triatoma carrioni* Larr taken in southern Ecuador in 1941 none was found naturally infected with *Trypanosoma cruzi*. Most of them refused to feed and died but two nymphs were fed on a healthy animal for two months and on 5th January 1942 one of them was fed on a mouse that had been infected with *T. cruzi* and showed a few trypanosomes in the blood. On 9th February developmental forms of *T. cruzi* were found in the dejecta of this nymph. The inhabitants state that the adults of *Triatoma carrioni* fly into houses by night attracted by light but as nymphs have also been found in dwellings the adults presumably continue breeding indoors even if they do come from outside.

WOOD S F A New Locality for *Trypanosoma vesperlouis* (= *T. cruzi*?) in Bats in the United States [Research Notes] *J Parasitology* 1943 Oct v 29 No 3 363

In July 1941 R. O. INGMAN found trypanosomes in blood smears from a bat of the species *Anrores pallidus pacificus* caught seven miles west of Plymouth Amador county California. The trypanosomes appeared to be identical with *T. vesperlouis* DIAS (*Trans Roy Soc Trop Med & Hyg* 1937 31 260) found what appeared to be the same trypanosome in the same species of bat at Pinole Contra Costa County California. This trypanosome closely resembles *T. cruzi* and the author thinks that it is important to search for *T. cruzi* in mammals and blood sucking arthropods in the central valley of California especially the area of the foothills of the Sierra Nevada mountains.

J F Corson

LEISHMANIASIS

PENAYANEZ A Ueber die Entwicklung der *Leishmania donovani* im Organismus und ihre Beziehung zu der Temperaturkurve [The Development of *Leishmania donovani* in the Organism and its relation to the Temperature Curve] *Deut Tropenmed Ztschr* 1943 Apr 15 v 47 No 5 193-8 2 figs

The study of cases of kala azar in Spain has led the author to a realization of the similarity of this disease to malignant tertian malaria.

In both he states the parasites apart from the gametocytes in the case of malaria are rarely seen in the peripheral blood. On this account nearly all cases of kala azar are at first mistaken for malignant tertian malaria. In malaria the parasite reproduces in the internal organs and there is a correlation between the stage of development of the parasite and the temperature curve. It occurred to him that a similar correlation might exist between the development of *Leishmania donovani* and the temperature curve in kala azar which actually bears a close resemblance to that of the malarial infections. By examining cases of kala azar repeatedly by spleen or sternum puncture the author claims to have traced a definite cycle of development for the leishmania of which there are four types or stages. The first is an elongated form with a rounded end in which the nucleus lies. The other end is pointed while the kinetoplast is apparently absent. The second resembles the first but is broader while a dot like kinetoplast is visible. The third type is oval or spherical with a distinct rod shaped kinetoplast. The fourth type is still larger with signs of nuclear and protoplasmic division. Presumably the products of division are parasites of the first type. Now the author maintains that in cases in which a regular attack of fever occurs each day repeated examination of the spleen or bone marrow by puncture will show in the stained films that the majority of the parasites are extracellular and are in process of multiplication as the attack of fever comes on. Later when the temperature commences to fall multiplication is complete and the smears will show the daughter form of the first type. The cycle typically occupies 24 hours but is only clearly seen in those cases which exhibit the well marked rise in temperature. In other cases there is considerable irregularity in the cycle which results sometimes in the temperature curve indicating a fever of the continuous type. When the temperature increases are not marked the smears will reveal a parasite degeneration indicative of the success of the protective processes of the host but if the attacks of fever are severe no such degeneration is evident.

The paper is illustrated by two temperature charts in one of which are depicted the various types of parasite described in relation to the rise and fall of the temperature. The observations recorded are admittedly very difficult to make and it must be questionable whether the author has been justified in drawing his conclusions from the somewhat meagre details available to him. *C M Wenyon*

VERSIANI O. Leishmaniose visceral americana [American Visceral Leishmaniasis] *Brasil Medico* 1943 June 19 & 26 v 57 Nos 25 & 26 268-71 3 figs [10 refs] English summary

A man 30 years of age made a journey on foot from the north east of Brazil across the plateau of Bahia to the state of Minas Gerais. He was ill on arrival suffering from fever with enlargement of the liver and spleen. No response being obtained to antimalarial treatment further investigations were instituted with the result that leishmania were demonstrated by spleen puncture. Though this is the first case of kala azar to be identified in the state of Minas Gerais no conclusion as to its autochthonous nature can be made as the man concerned had recently passed through Bahia where kala azar is of frequent occurrence. *C M Wenyon*

FERRO-LUZZI G Studio sul kala azar in Eritrea [Kala Azar in Eritrea] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1943 v 2 No 3 5-13 English summary (4 lines)

Though cases of kala azar in human beings and dog have been reported by various observers in Eritrea the disease is of sufficient rarity to justify the author in giving an account of nine cases which have come to his notice during the four years 1939-1943 All the patients were adults varying in age from 21 to 39 years six were Europeans and three natives The symptomatology of the disease is that of the Mediterranean kala azar C M Henson

IKUTH W & SCHMIDT H Zur Therapie der Leishmaniosen im Mittelmeerraum [Therapy of the Leishmaniasis in the Mediterranean] *Deut Tropenmed Ztschr* 1943 May 15 v 47 No 10 247-5

The authors discuss the chemotherapy of kala azar and note that response to neostibosan therapy is better in Indian and Chinese kala azar than in the Mediterranean or Sudanese forms of the disease Investigations carried out with the object of discovering a remedy which could be better for those forms which were difficult to cure with neostibosan and which would possibly be useful for mass therapy in India and China led to the discovery of solustibosan the first pentavalent antimonial (antimony gluconate) which could be prepared in solution ready for injection The total dose of this solution for intravenous or intra muscular injection (containing 20 mgm of pentavalent antimony per cc) was 2 cc for each kgm of body weight It was found subsequently that the single dose usually employed could be exceeded and that a dose of 10 or 12 cc could be administered so that a total of 120 to 180 or even 240 cc could be given with safety As the quantities to be injected with these higher doses were large trials were made of more concentrated solutions with the result that two new preparations were established —

(1) Concentrated solustibosan five times the original strength in which 1 cc contains 100 mgm of pentavalent antimony Pharmacological tests showed that in spite of the solution being hypertonic it was absorbed without irritation from the tissues This solution was thus capable of being administered intramuscularly as well as intravenously

(2) Solustibosan suspension in which 1 cc contains 54 mgm of pentavalent antimony The solustibosan in powder form is suspended in oil It seemed probable that the drug would be slowly absorbed from the oil depot so that the body would be under the action of the antimony for a longer time Tests on kala azar hamsters showed that while eight injections of the watery solution involving the administration of 500 mgm of solustibosan per kgm of body weight (in all 1080 mgm of antimony) sufficed to bring about a cure the same result was obtainable by a single intramuscular injection of 6 cc (324 mgm of antimony) of the suspension per kgm of body weight

Pharmacological tests on mice showed that a 20 gm mouse would tolerate a subcutaneous injection of 0.5 cc (13.50 mgm of antimony per kgm of body weight) as against 860 mgm of antimony administered in watery solution Röntgen ray examinations showed that the oil depot had been completely absorbed in 48 hours

Clinical trial carried out in China with the suspension showed that a single injection did not effect a cure though it was evident that the

result was obtained with more certainty and with a smaller number of injections than with the solustibosan solution RAMOS SALA and SAN JOSE treated children in Spain. The intramuscular injection of the suspension was well tolerated both locally and generally. The dose was 1 cc per kgm of body weight the full course consisting of five injections given at two day intervals. In over 90 per cent of the cases treated early there was a rapid response the fever disappearing after the first injection. Only in severe cases and in those in which other remedies had failed was the response less satisfactory so that a second course of injections was necessary. These observers also report on the use of concentrated solustibosan by intramuscular injection. The drug was well tolerated and gave good results. Satisfactory results were obtained by administering the drug every 12 hours a total quantity of 0.4 cc per kgm of body weight being given in 10 injections in five days. The concentrated solution has not yet been tried in adults for whom the dose would presumably be one fifth that of the usual unconcentrated solution.

In another direction the concentrated solution has been found useful. VILANOVA [this *Bulletin* 1943 v 40 828] has employed it for the treatment of oriental sore by local injection. For sores on the eyelids nose and ears it is the method of choice. These observations of Vilanova have led the author to test the concentrated solution on experimental oriental sore infections in the tails of mice. By administering 12 local injections it has been possible to eradicate the leishmania a result which could not be obtained in previous tests with other preparations. The author expresses a hope that the results so far reported mean that with the two new preparations a definite advance has been made in the therapeutics of Mediterranean kala azar and oriental sore.

C. M. Henson

LOZANO MORALES A. El solustibosan concentrado en el tratamiento del kala azar infantil. Ensayos previos. Pauta alterna [Concentrated Solustibosan in the Treatment of Infantile Kala Azar]. *Med Colonial* Madrid 1943 June 1 v 1 No 6 372-82 5 figs [20 refs]

The author gives an account of his experience in the treatment of five cases of infantile kala azar in Spain with concentrated solustibosan solution which contains 100 mgm of pentavalent antimony per cc. [see KIKUTH above]. The drug was administered intramuscularly in the gluteal region the total dose in each case being 0.6 cc for each kgm of body weight. For weights up to 30 kgm the author recommends the amounts of the first second and subsequent doses and the total quantity shown in the following table —

Patient's weight	1st dose	2nd dose	Later doses	Total
10 kgm	0.2 cc	0.4 cc	0.6 cc	6 cc
15	0.3 cc	0.6 cc	0.9 cc	9 cc
20	0.6 cc	0.6 cc	1.2 cc	12 cc
25	0.7 cc	0.8 cc	1.5 cc	15 cc
30	0.9 cc	0.9 cc	1.8 cc	18 cc

The injections were made on alternate days the first two doses representing a divided dose to avoid accidents from hypersensitivity.

they are followed by nine doses. The response to treatment was good. There was a marked increase in weight reduction in the splenomegaly and return to normal of the blood picture. In none of the cases was there any evidence of toxicity either local or general nor was there any tendency to development of antimony resistance. The final conclusion is that of the various preparations of antimony used for the treatment of kala azar this concentrated solution of solustibosan is the one to be preferred because it is non toxic gives satisfactory results and being in solution in ampoules is ready for immediate use.

C M Henyon

HENRY A J Instability of Stilbamidine in Aqueous Solution. [Correspondence] *Nature* 1943 Dec. 11 690-92

The author working in Khartoum has continued the investigation of the changes which stilbamidine in aqueous solution undergoes when exposed to the action of light. His results are in substantial agreement with those obtained in earlier experiments by FULTON and YORKE BARBER SLACK and WIEN. FULTON and GOODWIN [this *Bulletin* 1943, 40 23 36 683 684]. No products of the reaction have however been obtained and the author suggests that after prolonged exposure to diffuse daylight one or both amidine groups in the parent molecule undergo hydrolysis to the corresponding amides. These two products of hydrolysis have been isolated and characterized with fair certainty and the presence of ammonium chloride in the solution was established. He believes that *cis* stilbamidine and its hydrolytic products are also formed at the same time. On the other hand when stilbamidine solutions were exposed directly to tropical sunlight evidence was obtained that a polymerization product 1 2 3 4-tetra (4 amidino phenyl) cyclobutane was formed from two molecules of the parent substance and also *cis* stilbamidine. The author suggests on theoretical grounds that 2 (4 amidino phenyl)-6-amidino indene should be a stable product and might possess all the advantages of stilbamidine as a therapeutic agent.

Some of the different experimental conditions have been employed by the various workers to bring about the changes in stilbamidine. In the original experiments Fulton and Yorke exposed a 1 per cent solution to sunlight while Barber *et al* irradiated a 10 per cent solution with the light from a mercury vapour lamp with apparently the same results. In the present experiments the conditions were as described above the strength of the solution employed as not stated.]

J D Fulton

FEVERS OF THE TYPHUS GROUP

BAKER A C The Typical Epidemic Series *Amer J Trop Med* 1943 Sept 23 No 3 559-66

In this unconventional paper the author speculates on the origin and evolution of diseases belonging to the typhus relapsing fever and yellow fever groups. He suggests that the infecting agent of each of these diseases originated as an infection of a primary arthropod probably a tick or mite. Taking louse borne typhus as an example and

assuming that the primary arthropod is the rat flea—though he thinks that an acarine may really have been the first arthropod host of the Rickettsiae—the stages of evolution would be as follows —

Type of Disease	Transmission
Class 1 —The arthropod disease	Flea to flea only
Class 2 —The animal disease	Flea to rat rat to flea indefinitely
Class 3 —The endemic human disease	As Class 2 but incidental transmission from flea to man never man to flea
Class 4 —The intermediate human disease	Flea to man then man to louse which is the secondary arthropod and which then takes on the transmission characteristic of Class 5
Class 5 —The epidemic human disease	Louse to man man to louse indefinitely
Class 6 —The regressing human disease	Louse to man then the cycle ends owing to low virulence of the infection Brill's disease is given as an example the secondary arthropod has dropped out of the picture and the disease has become a mild disease of man only

The mite borne and tick borne typhus fevers have not progressed beyond class 3. In tick borne relapsing fever the primary arthropod alone is concerned in the louse borne disease classes 4 and 5 come into evidence through the intervention of the secondary arthropod the human louse.

In yellow fever it was formerly assumed that the only classes were 4 and 5 recently class 3 has been discovered in the form of jungle yellow fever the author believes that a class 2 type transmitted by a hitherto undetected primary arthropod will be discovered. The author believes that the existing differences in the strains of the infecting agents of each of the above diseases are accounted for by differences in the species of the primary arthropods concerned.

John W D Megaw

GRATCH I *Bacillus Proteus* OX19 agglutinated by the Serum of Pregnant Women *Amer J Surgery* 1943 June v 60 No 3 411-14 [11 refs]

During the preliminary stages of a survey of the incidence of Rickettsial diseases in the Philadelphia area it was noticed that the sera of pregnant women agglutinated *Proteus* OX19. An investigation directed towards this point gave the following results —

	Sera examined	Positive to OX19	Negative
Men	412	22	390
Non Pregnant Women	295	7	288
Pregnant Women	505	505	0

A further finding was that all the non pregnant females who had positive reactions were suffering from carcinoma. So also were two of the males with positive reactions—two other males had been vaccinated with *Proctisulalis*—in the remaining 18 no cause could be found for the positive reaction.

The stage of pregnancy at which the reaction becomes positive and the time taken for it to become negative after delivery remain to be discovered. In one case of a 12 year-old girl the reaction was weakly positive at an early stage while the diagnosis was difficult and the Friedman test was still negative. 12 days later there was agglutination at a titre of 1-1024.

A rapid simple test was employed in which a drop of serum was mixed with a drop of OVI9 suspension on a glass slide. The results were controlled by carrying out a simultaneous standard reaction in 30 pregnant women and the titre was found to range from 1-256 to 1-1024.

The implication of the test are discussed—it may prove to be a simple early test for pregnancy and even for malignant tumours subject to certain limitations, some of which are already known while others remain to be worked out.

These findings are of exceptional interest. Apart from the further investigations planned by the author it will be important to find whether other organisms besides *Proctis OVI9* are agglutinated in similar conditions.

The remarkable uniformity in the Weil-Felix titre in pregnancy suggests that the substance which agglutinates OVI9 is produced with greater regularity in the altered metabolism of pregnancy than in that due to the presence of Rick tissue. The findings also raise the broad question of the possibility of using agglutination reactions as indicators of certain unusual by-products of metabolism.

Neither the finding nor the speculations to which they give rise detract from the practical value of the Weil-Felix test as an aid to the diagnosis of typhus fever except in the case of pregnant women and perhaps also in the case of malignant disease—they suggest instead the possible opening of a fresh chapter in the romantic history of the agglutination reaction associated with the names of WILSON, WEIL and FELIX.

John H. D. Macfarlane

MORRIS P. L. Haemodiagnostic in typhus en milieu rural. A Typhus Haemodiagnostic Outfit in Rural Areas. *Bull Inst Hyg Maroc* 1942, 2, 33-9. 1 chart.

A handy case containing the requisites for carrying out Brumpt's rapid agglutination test has been put on the market by the firm Laboratoires Dausse. This outfit has been found very useful in rural areas for the immediate diagnosis of typhus and typhoid fevers both during life and after death. Its immediate issue to medical and public health workers is strongly recommended. Six cases are described to illustrate the help that can be expected from its use.

No description is given of the outfit but there would be no difficulty in designing a pocket case to contain phials of the Proteus and other suspensions, glass slides, pipettes, etc. needed for one of the rapid

bedside tests. Outfits of this kind may soon be regarded as indispensable for isolated medical men both in war and in peace.]

John W. D. Mega

KLIGLER I. J. & OLEJNIK E. Specific Diagnosis of Typhus Fever by Rickettsial Agglutination [Correspondence] *Nature* 1943 Nov 27 627-8

Comparative tests were carried out to determine the agglutination responses of patients to the Rickettsiae of murine and epidemic typhus. The results are shown in the table —

	Endemic Rickettsia Titre	Epidemic Rickettsia Titre	Weil Felix Titre
6 cases confirmed murine typhus in 2nd week	250 to 400	0 to 100	100 to 1 000
6 cases confirmed epidemic typhus about 8th day	0 to 100	80 to 600	0 to 200

In 12 louse infested typhus patients the reactions to epidemic typhus Rickettsiae were four reacted 1-80 five 1-160 and three 1-320

Up to the time of writing only one patient reacted in the same titre to both epidemic and murine Rickettsial strains the titre in this case was 1-640

Guinea pigs tested four weeks after recovery from murine and epidemic infection gave the following reactions —

	Titre							
	0	20	50	100	200	300	400*	800
After murine infection								
6 guinea pigs reacted to								
(a) murine Rickettsiae					2	2	1	1
(b) epidemic Rickettsiae	1	2	1	2				
After epidemic infection								
9 guinea pigs reacted to								
(a) murine Rickettsiae			6	3	2		6	1
(b) epidemic Rickettsiae								

Formolized vaccines of two murine strains T and K from Tunis and Palestine and from two epidemic strains A and R from Addis Ababa and Russia were used to immunize rabbits whose agglutination reactions for each of these Rickettsial strains were tested two weeks after the last dose of vaccine had been injected. The results in typical examples were —

which five were fatal in the other cases there was only an insignificant roseola or no rash at all. The duration of the fever was uniformly about fourteen days. The Weil Felix reactions were positive in 26 cases usually at titres of 1-250 to 1-500 persistently negative in 6 and not tested in 3. The strain employed is designated as O1 and \19. In two cases *Proteus* \2 and \11 also reacted but at the low titre of 1-50.

Dried *Proteus* cultures were used in trials of a rapid bedside test the reactions corresponded with those of the standard test in strongly positive cases but when the Weil Felix titre was 1-100 to 1-200 the results were inconclusive.

The leucocyte count ranged from 11 000 to 17 000 there was complete absence of eosinophiles pronounced lymphopenia and a deviation to the left of the Arneth index.

The chief features of this and four other outbreaks in Spanish Morocco are given in tabular form three of the other outbreaks showed similar clinical features except that in one of them the Weil Felix reaction is said to have been negative in all the cases. In the fourth outbreak the fever lasted seven days the Weil Felix reaction was negative there were no mental disturbances leucopenia was a pronounced feature and no death occurred in any of the 25 cases. [On the evidence supplied a diagnosis of dengue seems probable in this outbreak.]

John W D Megaw

AVTSIN A P **Conjunctival Exanthem in Spotted Typhus** *Arch Pathology* 1943 Aug v 36 No 2 158-62 1 fig [From the Chair of Pathological Anatomy of the First Moscow Medical Institute U S S R]

Red points or spots were seen in the conjunctiva of 94 per cent of typhus cadavers examined at the Moscow Clinical Institute for Infectious Diseases. In many cases these were the only distinctive naked eye sign that could be detected after death. They were absent only in cases in which death occurred late and from some complication such as pneumonia.

The spots were rounded or oval in shape these and the points were observed on the conjunctiva of the upper and lower eyelids sometimes also of the sclera they were of the nature of petechial haemorrhages.

By microscopical examination they were found to have resulted from vasculitis of the capillaries and small arteries which were thrombosed or affected by nodule formation. Secondary degenerative changes were seen in the overlying conjunctival epithelium.

Similar spots were found in septic endocarditis and meningococcal septicaemia. They could be detected in only 27 per cent of patients in the hospital wards and so are not likely to be of much help in diagnosis during life. Their significance lies in the fact that when found after death they justify a suspicion of typhus fever even in the absence of clinical data.

John W D Megaw

V STOCKERT F G **Die psychischen Störungen bei Fleckfieber** [Psychic Disturbances in Typhus Fever] *Deut med Woch* 1943 July 9 v 69 No 27/28 506-8

A very long list is given of the mental disturbances observed in typhus fever. Only a few of these can be referred to

In the early stages somnolence is the chief feature in some cases there is a tendency to katatonia soon there is restlessness or delirium picking at the bed clothes is frequently observed there may be a tendency to self injury or even suicide There may be euphoria or depression or an alternation of these states When delirium is pronounced the rash usually appears early In restless patients the movements tend to be choreiform A dream state may occur in which the patient believes that he has received a high decoration from the hand of the Fuhrer or that he has performed impossible feat The Korsakoff syndrome is often simulated and by the second week the speech is nearly always affected the articulation often being like that of a general paralytic Hallucinations of hearing are common Active delirium is of bad omen

The expansive hallucinations above referred to are more frequent towards the end of the fever or in convalescence Weeks or even months after defervescence there may be serious mental disturbance such as changes in disposition or criminal tendencies Defects in the eye muscles persist for three months in 10 per cent of the cases Mental deterioration may be permanent It is of the same type as in encephalitis

The period of convalescence should not be less than three months it may be up to six months

John W D Meade

WRI GOWSKI J Impfschaden nach Typhusfeberschutzimpfung?
Suspected Harmful Effect of Typhus Vaccine] *Deut med Woch*
1943 June 11 v 69 No 23:4 447-8

A German nursing sister aged 30 died of fulminating typhus fever 10 days after receiving her third dose of a carbolyzed typhus vaccine prepared at the Robert Koch Institute Berlin by the Gildemeister and Haagen method Other samples of the same batch were tested and found to be sterile and of normal toxicity to guinea-pig and white mice The dose was given at the unusually short interval of five days after the second dose On the day of administration the temperature rose to 40 C Next day the patient was admitted to hospital complaining of weakness and body pain especially in the arm into which the injection had been made The face was flushed the temperature was 38.2 C and there was albuminuria No other symptoms were noticed till the evening when there was stiffness of the neck

Early on the following morning the temperature was 37 C the pulse 72 and the injected arm could not be raised On the same morning the patient suddenly collapsed and died while passing a stool

At the autopsy a polymorphic rash was seen chiefly on the leg the dark red-eye and microscopical findings were characteristic of typhus fever

The author discusses the possible harmful effect of the short interval of five days between the dose and raises the question whether the fulminating character of the attack may have been due to the extra dose of typhus toxin given late in the incubation period [In fact the old problem of the negative phase is revived] He mentions evidence that a dose of typhus vaccine given during the incubation period may hasten the onset in some cases and increase the severity of the attacks

John W D Meade

CAMACHO TELLEZ J DIAZ ANGULO A ROMERO PEREZ M & SALAZAR G Relacion de algunos casos de tifo murino observados en la Costa del Estado de Sinaloa [Note on a Few Cases of Murine Typhus seen in the Coastal Region of the State of Sinaloa Mexico] *Medicina Mexico* 1943 Sept 10 v 23 No 443 353-5

In the course of an investigation in which blood cultures were being made for the detection of typhoid infection a non motile strain of *Proteus O119* was isolated from a patient whose symptoms suggested typhus fever

In two other cases which occurred shortly afterwards in December 1942 the same organisms were isolated The disease was diagnosed as murine typhus Three further cases occurred in May 1943 in these the symptoms were similar and the Weil Felix reaction was strongly positive One of the patients came from a place where fleas were exceedingly abundant The disease was regarded as murine because of the duration of 15 to 16 days and the rapid convalescence No reference is made to any laboratory tests except the Weil Felix reaction
John W D Meear

SHELLEY H M Tick Typhus *East African Med J* 1943 Sept v 20 No 9 300-301 2 figs on 1 pl

FIVE cases of tick typhus were seen in three years in Europeans in Tanganyika All the cases occurred in persons who had recently been living or travelling in the bush and who had been exposed to special risk of bites by ticks

The attacks resembled louse borne typhus except that the onset was gradual the rash was prominent and extended to the palms soles and face and was followed by staining which lasted several weeks Also there was often a primary sore and as occurred lymphangitis at the site of the tick bite The Weil Felix reaction varied from negative to strongly positive in one case the following titres were recorded — *Proteus O119* 1-500 *OXA* 1-25 *O12* 1-1 000

One case is described in which these features were present and the others are said to have been very similar
John W D Meear

READING B & KLINT H A Clinical Observations on Spotted Fever in the Gulf Coast Area of Texas *Texas Rep Biol & Med* 1943 v 1 No 2 97-104 4 figs

Four fatal cases of spotted fever [tick borne typhus] occurred in a locality in Brazoria Texas These have already been reported by the authors [see this *Bulletin* 1944 v 41 30] but more details are now given and from these points of interest have been collated (see table below)

In the first case there was no history of tick bite in the second a tick identified as *Dermacentor variabilis* was found on the back of the neck at the onset and there was swelling of the lymph nodes of the neck In the other two cases intracellular Rickettsiae were found by AUSTEIN and BADER [below also this *Bulletin* 1943 v 40 386] in the endothelial cells and guinea-pigs inoculated with the blood were later found to be immune to strains of Rocky Mountain spotted fever

Case	Date	Age	Day of disease on which death occurred	Leucocyte count	Reaction to <i>Procyon</i>	Rash
1	June 1937	5	12th	10 000 to 20 000	1-30 (11th day)	Over whole body petechial
2	July and Aug. 1939	7	30th	7 000 to 18 000	1-320 (17th day)	Macular then petechial with ecchymotic patches widely spread
3	June 1942	3	10th	3 900 to 15 500	Neg (6th day)	Petechial all over body with morrhagic patches
4	June 1942	10 months	9th	2 800 to 4 600	Neg (7 day)	Macular then petechial all over body diffusely haemorrhagic

ANIGSTEIN L & BADER M N Investigations on Rickettsial Diseases in Texas Part 1 Epidemiological Role of Ticks Common to the Gulf Coast in relation to Local Spotted Fever *Texas Rep Biol & Med* 1943 v 1 No 2 105-16 2 fig

Sera of various animals in the Gulf Coast region of Texas were tested against *Proteus* OX19 OX2 and OXA The reactions in most of the positive cases were about the same to all three strains and were as follows —

	Negative	Positive	Usual titres
Dogs heavily infested with <i>Rhipicephalus sanguineus</i>	2	19	1-80 to 1-160
Dogs not heavily infested with ticks	67	10	1-80 to 1-160
Cows infested with <i>Amblyomma americanum</i> and <i>A. maculatum</i>	60	18	1-80 to 1-160
Cows tick free	6	1	1-80
Hogs	102	22	1-160 to 1-320

Ticks collected from the same area were investigated but the results are not stated in such a way as to make them easy to summarize

About 2 500 adult *R. sanguineus* from apparently healthy dogs and about 2 000 larvae and nymphs hatching from deposited eggs of the same species of tick were divided into lots suspensions were prepared and inoculated intraperitoneally or subcutaneously into guineapigs in the usual way Details of the experiment are not given but it is stated that the majority of the guineapigs reacted with fever after an incubation ranging from 2 to 11 days In one case the infection was carried through nine passages involving 94 guineapigs A scrotal reaction was seen in only two of a large but unstated number of guineapigs smears of the tunica were negative

Of two rabbits inoculated intraperitoneally with tick (*R. sanguineus*) suspensions one developed pneumonitis and lung sections contained numerous Rickettsia like bodies The reaction to OX19 of this animal's serum was positive 1-160 on the 12th day having been negative previously

In a later experiment 98 *R. sanguineus* adults were inoculated into four guineapigs one of which became febrile on the 4th day and developed a scrotal reaction The testicles examined on the 6th day showed microscopical changes like those found in experimental spotted fever Attempts to passage the infection failed

A. americanum collected from cattle in Cleveland Texas where cases of the spotted fever type had occurred two years previously were tested in the same way in 1941 a highly virulent infection was caused in the guineapigs but no mention is made of the isolation of Rickettsiae

A less virulent infection was caused by *A. maculatum* collected in the same area but the strain could not be established by passage through guineapigs

John W D Megaw

ANIGSTEIN L & BADER M \ Investigations on Rickettsial Diseases
in Texas Part 2. Experimental and Epidemiological Studies on an
Outbreak of Spotted Fever in the Gulf Coast Texas Rep Biol &
Med 1943 1 No 2 117-40 1 graph & 6 figs [16 ref]

This paper contains a detailed report of the isolation and investigation of two strains of Rickettsiae from the blood of patients 3 and 4 of the series of cases described by READING and KLINT (above). The patient 3 was infected at the same time and place presumably from the same source and the infection was equally virulent in both causing death between the 9th and 10th days. Yet one strain was more lethal to guinea pigs causing a fatality rate of 12 per cent against 7 per cent for the other. The virulence for animals therefore did not give a true index of that for human beings.

Scrotal reactions in guinea pigs were slight but in the later passages occur in later passages they were more frequent when they did. Rickettsiae were recovered from tunica smears corresponded with that of the experimental disease in guinea pigs. Rocky Mountain spotted fever transmitted by *Dermacentor* was also present when they did.

The results of immunity tests were—(1) By test in guinea pigs the two local strains gave almost complete reciprocal cross immunity. (2) Guinea pigs congenitally from the disease caused by each strain were immune to Rocky Mountain spotted fever. (3) In one set of tests it was found that guinea pigs which had recovered from Rocky Mountain fever had little or no immunity to the local strains but in another series immunity was complete. (4) An interesting finding was that no cross immunity was found between either strain and two strains of louse-borne Rickettsiae. This finding is opposed to that of CASTANEDA and SILVA in *Bull. 1942* 39 151 in which a pronounced degree of partial immunity was observed between *Rickettsia prowazekii* and *R. rickettsii*.

Egg yolk vaccine of the Cox type prepared with *R. rickettsii* protected guinea pigs against both of the local strains. Suspensions of *Anopheles crucians* from do in the locality where the cases occurred caused a febrile reaction in one of two guinea pigs inoculated with suspensions made from senile ticks. The infection was passed to other guinea pigs which had febrile reactions lasting three to four days after an incubation of seven days. After recovery these animals reacted to the local strains with low fever after a long incubation period and were regarded as being partially immune.

The authors suspect that mild cases of spotted fever may occur in the locality and are wrongly diagnosed as typhus. [The name spotted fever obviously refers to a tick-borne fever of the typhus group and the name typhus to the flea-borne fever of the same group. Both of these names are rather ambiguous.]

John H. D. Meade

SIZEMORE P Rocky Mountain Spotted Fever Oklahoma State Med
Ass J 1943 Jul 36 282 Summary taken from J Amer
Med Ass 1943 Oct 9 123 No 6 384]

Sizemore reports observations in 7 cases of Rocky Mountain spotted fever. The cases occurred in a family in the town of Armstrong in

Bryan County which is located in the south central section of Oklahoma. The family lived here for several years but had moved into a new unpainted green lumber house only a short distance from their previous home. The household consisted of a couple, their three children and the wife's mother. The latter aged 67 died of the illness contracted by all of them. All developed what was first suspected to be typhus but later was identified as Rocky Mountain spotted fever. The attending physician Dr. Flythe aged 44 died of the disease. A man aged 47 who had stayed at the home of the family while the first three members were ill became ill and died. The rash suggested that this fatality was also caused by the Rocky Mountain spotted fever. Questioning brought out the fact that all members of the household had been bitten repeatedly since moving to the new house by ticks which infested the yard. The gopher proved to be the ticks' host in the Armstrong area. The use of vaccine in infested areas each year is indicated. This is best given in late winter or early spring. The vaccination should be completed at least ten days before the first expected exposure. The vaccine is not recommended for therapeutic use.

BAKER G. L. Rocky Mountain Spotted Fever. Nine Year Study of Wyoming Cases. *Journal Lancet* Minneapolis 1943 July v 63 207 [Summary taken from *J Amer Med Ass* 1943 Oct 9 v 123 No 6 382]

Baker points out the close resemblance of endemic typhus to Rocky Mountain spotted (tick) fever. The degree of protection afforded by vaccine and the duration of such protection vary. As a rule those vaccinated in the spring of the year retain a considerable degree of immunity for at least the remainder of that year. Treatment of tick fever is purely symptomatic and supportive in character. Bed rest with good nursing care is necessary. The author had occasion to study the various aspects of tick fever in a section of Wyoming where the disease occurs with considerable frequency. In 1934 Kamp and the writer received encouraging reports of responses obtained in typhus by use of neoarsphenamine dissolved in aqueous solution of metaphen. In the spring and summer of 1934 they used this treatment in 9 moderately severe cases of the disease. None of the patients succumbed to their illness. Since that time an average of 3 to 4 cases of tick fever have been under the writer's care each season. During the past eight years recovery has occurred in all cases so treated. A combination of the bactericidal action of metaphen together with the spirocheticidal action of neoarsphenamine on a micro organism which is bacterium like in character yet has staining properties similar to those displayed by spirochetes may be the secret of the success. In this treatment 0.3 Gm. of neoarsphenamine was dissolved in 10 cc. of an aqueous solution of 1:1000 metaphen. The mixture was warmed and injected slowly into a vein. Administration is repeated at three or four day intervals. Three or four injections have customarily been sufficient to ameliorate the clinical picture so as to insure ultimate recovery. Should severe renal injury exist as a result of the infection careful consideration must then be given the question as to whether the use of the e-medicaments is justified.

CAMERON E. Rocky Mountain Spotted Fever. Summary of Recent Literature dealing with Virulence and Therapeutic Value of Immune Rabbit Serum. *Delaware State Med J* Wilmington 1943 Aug 1: 139 [Summary taken from *J Amer Med Ass* 1943 Nov 6: 123 No 10: 659]

It has been accepted that the western strain of the virus of Rocky Mountain spotted fever is more virulent than the eastern strain and hence accompanied by a higher mortality rate. Observations have been made according to Cameron which indicate that this view is not entirely correct. Comparative studies on large numbers of cases from western and eastern states revealed that there was no significant difference in the fatality rate in comparative age groups. There is a significant difference between the fatality rates in the age group 40 and over and those of younger age groups. Immune rabbit serum given early following infection in an adequate dose gave the best results in repeated experiments on monkeys and guinea pigs. In studying the human cases it was impossible to use an untreated group as a control. The fatality rates were compared in a series of 19 cases treated with immune rabbit serum after the third day of the rash and in a series of 52 cases treated on or before the third day of the rash. While the series are small the inference is that immune serum is of value if used early in the infection. Up to the present there have been 13 cases reported in Delaware in 1943. There were three fatalities in one of which immune rabbit serum had been given.

PIZA J d T. A vacina de Spencer Parker contra a febre maculosa na pratica sanitaria. [The Spencer Parker Spotted Fever (Tick Borne) Vaccine in Public Health Practice]. Reprinted from *Argumentos de Ciria Clin e Exper* 1942 Oct-Dec 1: 6 Nos 5-6: 1329-57. 6 graph. English summary.

The tick borne exanthematic typhus fever of Sao Paulo or spotted fever has become a serious public health problem in some parts of Brazil. The number of cases and the range of distribution have been increasing rapidly in the past few years. The case-fatality rate is about 90 per cent. Since 1939 more than 10,000 persons in heavily infected localities have been vaccinated with the Spencer Parker type of vaccine (a formal protein preparation of infected ticks see this Bulletin 1943 1: 225-7, 1946 1: 33-47) and the results have been highly satisfactory. In one place where the death rate in non-vaccinated patients had been over 90 per cent it was reduced to about 81 per cent in the vaccinated.

The special advantage of the vaccine in public health practice was that it kept the disease under control during the period in which areas were being systematically disinfested of ticks. In some of these areas the tick infestation was intense and the tick infection rate was so high that rabbits and guinea pigs kept in natural conditions became infected.

The vaccines used were prepared at the Butantan Institute of Sao Paulo and at the Rocky Mountain Laboratory at Hamilton. Both of these vaccines gave approximately the same degree of protection and were followed by the same percentage of reactions.

In heavily infected areas it is recommended that revaccination should be carried out twice during the first year and should afterwards be repeated yearly.

John H. D. Megaw

LIVESAY H R & POLLARD M Laboratory Report on a Clinical Syndrome referred to as "Bullis Fever" *Amer J Trop Med* 1943 Sept v 23 No 5 475-9 1 fig & 1 chart

This paper contains a report of an extensive series of laboratory investigations directed to finding the cause of the problematic short fever called Bullis fever [see this *Bulletin* 1944 v 41 34]

Guineapigs inoculated by the intracerebral route with spinal fluid from patients developed a transient mild fever on the 9th day in several cases. In one case a serial passage was successful but there was no apparent increase in virulence. Brain substance from reacting guineapigs inoculated by the intravenous route into developing chick embryos caused death within six to nine days and the same result was obtained in five serial transfers by the same route.

In guineapigs inoculated with the blood of patients by the intraperitoneal route a low grade febrile reaction lasting two days occurred consistently on the 9th to the 10th day. There was no scrotal reaction but in two cases an aseptic fibrinous peritonitis was observed. Five serial passages were made in guineapigs and there was a progressive rise in the percentage of reactors. Smears from the spleens and peritoneal scrapings of the guineapigs showed small red stained rods and coccoid bodies in the cytoplasm and nuclei when stained by Machiavello stain.

Biopsy specimens of the enlarged lymph nodes of patients were used to prepare films which when stained by the Machiavello technique showed small intracellular fuchsin stained granules and rods. These were not seen in films stained by Wright's stain. Emulsions of the same lymph nodes caused a febrile reaction in guineapigs through three passages. The incubation period was 8 to 12 days. The temperature 104 to 104.5 F and the fever lasted two to four days. There was no orchitis.

Rocky Mountain spotted fever was excluded by cross immunity tests. By various serological and other tests typhus fever, Q fever, Chagas's disease, equine encephalomyelitis and lymphocytic chorio meningitis were also excluded.

About 150 ticks mostly *Amblyomma americanum* were collected at random in the affected area and tested by guineapig inoculation. One positive result was obtained in which intracerebral inoculation caused a rise of temperature to 106.2 F for 24 hours on the 9th day.

It was concluded that Bullis fever is a previously undescribed syndrome apparently caused by Rickettsiae which may be transmitted by an arthropod vector, the tick or *Trombicula* in the Camp Bullis area.

John W. D. McLean

BARTONELLOSIS

HOWE C Immune Serum Therapy for Oroya Fever *Arch Intern Med* 1943 Oct v 72 No 4 429-38 5 figs

The author records three cases of Oroya fever treated by intravenous injections of rabbit serum obtained in the following way. Four strains of *Bartonella bacilliformis* were obtained, three from Oroya fever patients and one from a Peruvian sandfly. These were maintained on Geiman blood agar. For the purpose of immunizing rabbits a 5 day old

culture at 25 C was suspended in saline after centrifuging. An emulsion of a strength of two plants per cc. was made. One cc. was given to rabbit on each of three successive days and after a rest of 3-4 days this course was repeated twice. One rabbit was given a suspension of 10 maldehyde-treated organisms, eight others had fresh suspensions. After this each animal was bled twice, perhaps three times. Their serum agglutinating titre was usually 1:2560.

Three patients were treated with this: a man of 31, another of 21 and a lad of 15 years. The first had 10 cc daily intravenously on the 20th to 24th day of disease, 50 cc in all; the man of 21 had on the 21st and 20th day of illness 100 cc and 150 cc transfusion of whole blood (the donors had never had Carrion's disease) and from the 23rd to 25th day 10 cc doses daily of the immune serum. The lad of 15 had a total of 60 cc, namely 10 cc on the 8th, 10th, 12th, 13th, 14th and 17th day of illness.

In none of the three was there any very distinctive change in the clinical picture of the disease, but in the boy the typical miliary eruption appeared unusually early on the fourteenth day of illness. Also in all three there followed shortly after the injections began a distinct fall in the percentage of infected corpuscles, indicating that the serum has some effect in clearing the organism from the blood stream. It is suggested that a stronger serum might be still more effectual. It remains to be determined whether the change in the number of infected corpuscles was merely coincident with or was directly consequent on the injection.

Another effect noticed was a change in the character of the colonies on culture: instead of being finely granular and numerous, they were fewer, larger and coarser. The difference is well depicted in a photograph of the culture tube.

H. H. H. Scott

YELLOW FEVER

SMITH, H. H., BEVEL, G. A., BUCHER, J. C. The Distribution of Yellow Fever in Colombia in Recent Years. *Amer. J. Trop. Med.* 1943 Sept. v. 23 No. 3: 507-22. 1 fig. & 2 maps. 21 ref. j.

After the last known case of yellow fever disappeared from the Colombian coastal towns about 1920 it was thought that the disease had been entirely eradicated from the country. Therefore the outbreaks which occurred in the interior towns of Bucaramanga in 1923 and in Socorro in 1929 were very difficult to explain and had the diagnosis not been confirmed subsequently by laboratory tests, yellow fever might not have been accepted generally as the cause of the epidemics. With the establishment of the specificity of liver lesions as a means of diagnosis, fatal cases of yellow fever and the discovery of the mouse protection tests for the demonstration of specific immune bodies in the blood, it became possible to carry out surveys to determine accurately the distribution of the infection throughout the country. Since 1931, therefore, a considerable amount of epidemiological information has been accumulated which demonstrates clearly that the jungle type of yellow fever is probably present continuously in certain areas of Colombia. The endemic zone comprises the Departments of Antioquia, Boyaca, Caldas, Cundinamarca, Santander and Tolima and the Intendencia del Meta. The results of immunity surveys make it appear probable that the disease has existed in recent years in other

widely separated parts of the country such as the Arato Valley and the Colombian Amazon drainage. With the exception of a very small epidemic in Buenavista Caldas in 1937 no incidence of yellow fever transmitted by *Aedes aegypti* has been observed in Colombia since 1929.

Hugh H. Smith

GILMORE R. M. Mammalogy in an Epidemiological Study of Jungle Yellow Fever in Brazil. Reprinted from *J. Mammalogy* 1943 May v 24 No 2 144-62 4 figs & 2 pls

The author of this report is a zoologist who from 1935 to 1938 was attached to the Yellow Fever Service maintained jointly by the Government of Brazil and the Rockefeller Foundation. During the period of his stay in Brazil intensive studies on the possible role of wild animals in the epidemiology of jungle yellow fever were in progress. The types of traps which were found most useful for the capture of various animals are fully discussed and illustrated. From his considerable experience the author states his views on the keeping of proper field records, the collection and preservation of specimens for subsequent study, the collection and preservation of ectoparasites, the presentation of taxonomic information and the methods of handling animals in the field. Useful data on the estimation of the age and growth rates of certain animals are given. This information is of course important when immunity surveys on animal populations are undertaken. Also some observations on the territorial movements of Cebus monkeys are reported. These animals have been suspected repeatedly of being of importance in the spread of yellow fever infection in forested areas.

[This paper will be of value to those who are concerned with the investigation of epidemiological problems in which wild animals may play a rôle.]

Hugh H. Smith

LENNETTE E. H. & PERLOWAGORA Alina. The Complement Fixation Test in the Diagnosis of Yellow Fever. Use of Infectious Mouse Brain as Antigen. *Amer. J. Trop. Med.* 1943 Sept v 23 No 5 481-504 [21 refs.]

The occurrence of specific complement fixing antibodies in the blood of man and monkeys recently recovered from yellow fever has been known since 1929 [see this *Bulletin* 1929 v 26 1004 1931 v 28 719 1932 v 29 576 1933 v 30 3]. The antigens used in the early work were infectious monkey serum or liver extracts. Liver antigens were variable in antigenic activity and also occasionally gave rise to non-specific fixation of complement. Monkey serum was open to the objection that it was not only a less sensitive antigen than monkey liver but also that its large content of antishoop amboceptor may produce falsely negative tests. The development of a virus neutralization test in mice proved to be a more accurate immunological method so the complement fixation test was discarded. Recent work by CASALS and PALACIOS [*Bulletin of Hygiene* 1942 v 17 444] has resulted in obtaining highly satisfactory specific complement fixing antigens from mouse brains infected with any one of a number of neurotropic viruses thus avoiding the well known highly anti-complementary properties of crude extracts of nervous system tissues. The authors felt it might be worth while to apply this new technique to immunological studies on yellow fever.

The anti-en preparation from freshly removed infected mouse brains which are triturated either in a mortar or in a ball mill. A 10 per cent suspension of this brain paste is made with physiological saline containing 2 per cent of an inactivated normal guinea pig serum. This suspension is centrifuged after 24 hour refrigeration. The supernatant fluid is drawn off and frozen and thawed five times in a mixture of alcohol and carbon dioxide ice. The anti-en preparation is again centrifuged and the resultant relatively clear supernatant is removed and stored in the refrigerator in glass-stoppered pyrex bottles, merthiolate having been added to a final concentration of 1:10,000. The technique of this test is essentially the same as that recently described by LEVERTE and HORSFALL (see *Bulletin of Hygiene* 1941, 16:99) for influenza virus.

The authors conducted a series of experiments to demonstrate that the complement fixation test with yellow fever mouse brain antigens is biologically specific. Mouse sera containing antibodies to the viruses of lymphocytic choriomeningitis, St. Louis encephalitis, Japanese B encephalitis, Eastern equine encephalomyelitis, and West Nile disease gave negative tests in the presence of this antigen. As regards yellow fever the specificity of the antigen was demonstrated by its ability to fix complement in the presence of serum from monkeys recovered from infection but not in the presence of serum taken from the same animals prior to infection. In monkey complement fixation, antibodies were found to be present in the blood serum at the end of the second week after infection. They reached a maximum titre during the third week or so and then gradually disappeared leaving only small residual titre at the end of four months. Among persons vaccinated with the 17D strain of virus, only about 20 per cent of those in whom no post-vaccination reaction occurred gave a positive fixation test. Among those who experienced relatively severe post-vaccination reactions from 70 to 80 per cent of the sera were capable of fixing complement. Sera from persons passing through natural yellow fever infection gave a high incidence of positive results. The results of the mouse protection tests and the complement fixation test agreed in about 90 per cent of the cases.

Although the complement fixation test is of no value for routine checking of post-vaccination results it promises to be of considerable use in field immunity surveys. The rapid disappearance of complement fixing antibodies from the blood after infection indicates that when this antibody is present the infection must have been relatively recent. The complement fixation test therefore may have a definite rôle in attempts to delineate recently endemic or epidemic areas of yellow fever.

Wassermann positive sera tend to give non-specific reactions which in the majority of cases can be eliminated by inactivation of the sera at 60 C.

Hugh H. Smith

BOL. OFICINA SANITARIA PAN-AMERICANA 1943, vol. 1, 22, No. 6, pp. 23-36, 3 fig. English summary. Recente vitória contra a febre amarela no Brasil. The Recent Conquest of Yellow Fever in Brazil.

Having paid tribute to Brazil before for having eradicated the deadly *A. gambiae* in 1940 the Bulletin of the Pan American Sanitary Bureau once again congratulates that country for having also eradicated the *A. aegypti*, the yellow fever vector in a feat hitherto considered practically impossible from the States of Maranhão, Espírito

Santo Minas Gerus Goias Parana Santa Catarina and the Federal District With the cooperation and under the leadership of the Rockefeller Foundation the National Yellow Fever Service of Brazil has rendered and is continuing a service of great importance to the entire hemisphere The campaign in its planning execution and consequences evidences the true spirit of Panamericanism A proof of the efficiency and success of this work has been the absence since 1934 of outbreaks of yellow fever in the cities of Brazil even though sporadic cases of jungle fever have occurred in the vicinity of the city limits of Rio de Janeiro Viscerotomy has been one of the Service's notable achievements Throughout the country 1 278 viscerotomy posts were established and during the period from 1930 to 1941 246 157 liver specimens were studied Through this work the Service has been able to establish the exact geographical distribution of a large group of known diseases in Brazil as well as having discovered the existence of new ones In the protection test work the Service has examined the blood of 62 559 persons During the period of November 1937 to December 1941 2 107 916 persons have been vaccinated against yellow fever by the physicians of the Service The main part of the laboratory work is done in Rio de Janeiro in the yellow fever research laboratories under the direction of the Rockefeller Foundation Other small ones have been established for future field use in the following districts Espirito Santo Vale de Canaa (1932) Minas Gerais Teofilo Ottoni (1935) Para Marajo (1935) Goias Anapolis (1936) Parana Maracaju (1937) Espirito Santo Vitoria (1940) The National Department of Health of Brazil has since January 1940 assumed complete charge of the yellow fever campaign

LEWIS D J The Destruction of Mosquito Larvae by Terrapins *Sudin Notes* 1942 v 25 Pt 1 141 [Summary taken from *Rev Applied Entom Ser B* 1943 Nov v 31 Pt 11 214]

In the course of a mosquito survey during the epidemic of yellow fever in 1940 in the Nuba Mountains the author examined numbers of domestic water jars In two villages near Talodi he found that 25 per cent of the jars each contained one or two small water tortoises (*Pelomedusa galeata*) and no mosquito larvae If the tortoises were given mosquito larvae they fed voraciously on them and larvae of *Aedes aegypti* L were found in several of the jars that did not contain a tortoise These two villages were among the few in which *A. aegypti* was common in the dry season (November) the reason being that water is stored for long periods in unusually large jars and they are near the area where the epidemic is thought to have started

THOMAS H D Preliminary Studies on the Physiology of *Aedes aegypti* (Diptera Culicidae) I The Hatching of the Eggs under Sterile Conditions *J Parasitology* 1943 Oct v 29 No 5 324-8 [10 refs]

FRÖES H P O estado de guerra e o problema mundial da febre amarela com especial referencia ao Brasil [War and Yellow Fever with special reference to Brazil] *Brasil Medico* 1943 July 3-10 17-24-31 & Aug 7-14 v 57 Nos 27-28 29-30-31 & 32-33 284-9 314-17 335-6 [Refs in footnotes]

DENGUE

McCARTHY D D & BRENT R H An Account of an Outbreak of Dengue Fever in Dzaoudzi Comoro Islands January 1943 *Trop Afric Med J* 1943 Sept & 20 No 9 293-8 2 figs

Dzaoudzi is an island 600 yards in diameter in the Comoro group east of tropical East Africa. The rainy season is from December to March and the average temperature is 90 F. The mosquitoes increase rapidly from the beginning of the rainy season.

The outbreaks of dengue began on the 1st of January 1943 most of the attacks occurred between the 10th and the 21st of the month and the last attack occurred ten days later.

There were 59 cases 30 in Africans and 29 in Europeans. The onset was sudden there was a rigor in half of the cases the pulse was about 100 at the onset but soon fell to the normal rate. There was a rubeloid rash against an erythematous background on the 2nd to the 4th day in 30 per cent of the European patients and in 7 per cent of the Africans. There was cervical or epitrochlear adenitis in six Africans and one European. Except for severe headache there is no reference to pains. Many of the permanent inhabitants have mild attacks yearly but these last only two to three days so that there is evidence of a partial degree of immunity resulting from previous attacks.

It was suggested by some medical men that the cases ought to have been diagnosed as sandfly fever but no sandflies were found.

[The temperature charts reproduced in the article are typical of well recognized forms of dengue the fever seems to have lasted six days in most of the cases.]

John W D Maca

PLAGUE

FRANCIS E Twenty Year Survival of Virulent *Bacillus pestis* Cultures without Transfer *Pub Health Rep Wash* 1943 Sept 10 & 58 No 37 1349-52

The title of this article gives exactly the conclusion arrived at with the further detail that this happened with cultures on sloped beef infusion agar which had been kept at 10 C. Out of the 48 stored cultures tested 33 gave growth on subculture while 15 failed to do so. Most interesting are the facts regarding virulence which was tested on guinea pigs by subcutaneous inoculation—(1) Eleven of the guinea pigs survived the inoculation with little to show. (2) Thirteen died near the end of the first week without showing significant gross change in spleen nor caseation of inguinal lymph nodes. (3) Three died with lesions of acute plague. (4) Six were killed before death and plague bacilli were isolated from heart blood while acute plague lesions were evident at the site of inoculation in the spleen and in the inguinal glands. The strain tested P4-7 had been originally isolated from a California ground squirrel (*Citellus beecheyi*). H F Harte

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

HORSTER Die Bedeutung der Amobenruhr für Nordafrika und ihre Bekämpfung [Amoebic Dysentery in North Africa and its Prevention] *Deut Tropenmed Ztschr* 1943 June 15 v 47 No 12 299-302

The author discusses amoebic dysentery as it occurred amongst the German troops in North Africa. He adopts Westphal's view that *Entamoeba histolytica* is in the first place a harmless inhabitant of the intestine and that actual amoebic dysentery only supervenes when the wall of the intestine has been injured so that invasion of the intestinal wall by the amoeba can take place. The commonest cause of such injury is bacillary dysentery against which the newly arrived unaccustomed troops have no immunity. Whereas bacillary dysentery and other bacterial disorders of the intestine are common amongst the newly arrived troops they rarely occur amongst the indigenous population or troops which have been stationed for a considerable time in the country. In consequence amoebic dysentery is the common type of dysentery amongst the local inhabitants and seasoned troops while bacillary dysentery is commonest amongst the new arrivals. The author notes that in 1941 of the admissions to hospital for intestinal disorders 25 per cent were found to have an *E. histolytica* infection though in only some of these was the amoeba the cause of the trouble. It follows therefore that the easiest method of preventing amoebic dysentery is to take every precaution against the bacterial infections by the strictest cleanliness in the preparation of food the maintenance of health by proper diet and the adoption of all the recognized sanitary measures. Furthermore the author advocates the general employment of a latrine-rivanol medication as a prophylactic or as a means of eradicating the lumen infection before invasion of the intestinal wall has occurred. In cases of amoebic dysentery treatment with emetine has to be undertaken. For satisfactory results every sanitary unit should have a good laboratory and a staff previously trained in diagnostic procedure. C M Henson

ANGELETTI G Beiträge zu dem Problem der Histolyticaträger in Venetien und zur klinischen Diagnose der Darmamoebiasis [*E. histolytica* Carriers in Venice and Clinical Diagnosis in Intestinal Amoebiasis] *Deut Tropenmed Ztschr* 1943 May 1 v 47 No 9 228-30

In 1938 the author had occasion to examine for intestinal protozoal infections Italians returning from East Africa. In a group of 100 the following percentage infections were noted: *E. histolytica* 20, *E. hartmanni* 9, *E. coli* 27, *I. butschlii* 8, *E. nana* 32, *D. fragilis* 8. Being unable to establish a relationship between the parasitological findings and the clinical symptoms the author was led to study the infections in a group of 400 men who had never been in a tropical country. The infection percentages were 4.75, 3.50, 21.0, 3.0, 21.25 and 1.25 respectively. A careful study of those infected showed that none of them was in ill health or revealed any symptoms which could be ascribed to the presence of *E. histolytica*. The author comes to the conclusion that in the district of Venice where the study was made this amoeba is normally a harmless inhabitant of the intestine and that there is no justification for diagnosing a disease syndrome on the

and the pain was epigastric. In neither case were amoebae found in the faeces. Laparotomy was performed in each case and great stenosis of the hepatic cystic and common bile ducts was found. In the woman the gall bladder appeared to be normal but contained white bile while in the man it was hidden by loose adhesions and was red and thickened and the bile was viscous and bloodstained.

Both patients died the woman three weeks after the operation the man on the day following the operation and autopsies were made. In both cases the hepatic cystic and common bile ducts were grossly stenosed it being impossible to pass a probe down to the duodenal ampulla. The liver of the woman contained several large cavities with ragged walls but very little pus in the man the liver appeared to be normal but section showed some cell destruction and the presence of amoebae. The pancreas and duodenum were normal in both and there were no signs of new or old inflammatory reaction round the ducts nor of glandular enlargement.

The author concludes that the stenosis was probably due to amoebic infection of the ducts in both cases and that the infection of the liver occurred later than that of the ducts.

J. F. Corson

IRISH D. & DIAZ RIVERA R. N. Perinephric Abscess—a Previously Unreported Complication of Amebiasis. *Amer J Med Sci* 1943 Sept. 1, 206 No 3 31-8 5 fig.

A man 47 years of age giving a history of a condition presumed to be amoebic dysentery was operated upon for perinephric abscess which completely resolved by drainage. Examinations of fresh preparations of the pus failed to reveal *Entamoeba histolytica* which however was discovered on two occasions in blocked paraffin sections of the pus. Though the microphotographs of the amoebae reproduced in the paper are not entirely convincing the author states that the diagnosis can not be questioned. The paper gives a useful summary of literature dealing with amoebic infections in relation to the kidney.

C. M. Henyon

HERRLICH A. Ein Fall von linksseitiger Leberabszess mit Durchbruch ins Perikardium. *Wiener Medizinische Wochenschrift* 1943 July 16 86 No 27/8 431-4 1 fig. 18 f.

ROTHMAN M. M. & LASKEY MARION Survey of Protozoan Infection of the Staff of a Large General Hospital. *Amer J Med Sci* 1943 Sept. 1, 206 No 3 369-71

The staff examined comprised nurses porters members of the business office and other who were not patients. In all 306 persons were examined and 44.4 per cent of these were infected. Of the protozoa determined the following percentage rates of infection were obtained: *E. coli* 17.3 *E. nana* 12.7 *G. intestinalis* 10.1 *F. histolytica* 3.6 *D. fragilis* 2.3 *I. lutschii* 0.7 *C. mesnieri* 0.7 *E. hominis* 0.3.

C. M. Henyon

LORINCZ F & JUPANY Erika Beiträge zur klinischen Bedeutung der Giardiasis [Observations on the Clinical Significance of Giardiasis] *Deut Tropenmed Ztschr* 1942 Oct 15 v 46 No 20 505-9

In a children's home in Hungary the authors undertook the study of 183 children from the point of view of giardia infections. The ages of the children varied from a few months to 12 years and they were kept under observation for a year examinations for infection being carried out each month. In some cases giardia was detected only once in others the infection lasted for some months while in others again it was detected at every examination. The children were carefully classified in groups according as to whether the body weight or height were above or below normal. They were also grouped according to the presence or absence of symptoms of one kind or another. Those who were responsible for the classification of the children in these various groups were not aware of the parasitological findings so it was carried out without bias. When finally the clinical and parasitological findings were examined together and subjected to a careful analysis it became clear that no outstanding case for the pathogenicity of giardia could be established. In the overwhelming majority of cases of infection this was quite symptomless and even when certain troubles could be ascribed to it these were not of a serious nature. The development of the children was in no way impeded by the presence of giardia.
C M Wenvon

YOUNG M D & BURROWS R Carbarsone Treatment for *Balantidium coli* Infections *Pub Health Rep Wash* 1943 Aug 20 v 58 No 34 1272-3

This report on the treatment of seven cases of infection with *Balantidium coli* indicates that carbarsone is an effective drug. The patients were treated at the South Carolina State Hospital during 1939 they constitute the largest group as yet treated in the United States. Two doses each of 0.25 gm. were given daily for 10 days to four patients cure was effected in one course in 2 and in two courses in 2. The infection disappeared in the fifth case after smaller doses. In the remaining 2 patients two doses each of 0.5 gm. daily for 10 days eradicated the infection.

Examinations made for periods varying from 1 month to 4 years after treatment failed to reveal the parasites. [The patients were mentally defective white women see this *Bulletin* 1940 v 37 373]

Charles Wilcocks

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

DIXON K C Some Serological and Biochemical Observations on Relapsing Fever *J Roy Army Med Corps* 1943 Oct v 81 No 4 193-7

The author collected blood containing *Spirochaeta recurrentis* from 24 cases of relapsing fever among troops in Cyprus during the first half of 1942 and made Kahn tests on the resulting sera. Four gave

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positive Kahn reactions one a partially positive reaction and the remaining 19 gave negative reactions. It was only possible to follow up two of the seropositive cases one was positive three weeks later and the other after four weeks.

In addition the urine from these patients was examined for urobilin by Slesinger's test and also by Ehrlich's test for urobilinogen. The great majority of the cases showed the presence of much urobilin in the urine which correlated with the fact that jaundice occasionally occurs in relapsing fever and liver damage insufficient to produce this symptom may yet be extensive enough to cause urobilinuria.

E Hindle

BEESON, P. B. The Problem of the Etiology of Rat Bite Fever. Report of Two Cases due to *Spirillum minus*. J. Amer. Med. Ass. 1943 Oct 9: 123 No 6 33-4 2 charts

The description of two cases of rat bite fever in the hospital at Atlanta Georgia at the end of 1942. One case was a white boy aged two years and the other a white woman aged 9 and both had been bitten by rats while sleeping. *Spirillum minus* was isolated from the blood of each patient by inoculation into mice but the organisms did not appear in the blood of these animals until the 16th and 17th days. In view of the clinical similarity of infection due to *Streptobacillus moniliformis* [see this Bulletin 1942: 39 693] blood cultures were made from both patients but with negative results.

E Hindle

BURK, S. B. & HODAS, J. H. Rat Bite Fever. Case Report. Amer. J. Surg. 1943 June: 60 No 3 453-4 [10 refs]

The record of a case of rat bite fever in a white woman aged 60 admitted to a New York Hospital nine days after being bitten by a rat. The wound had been cauterized the day after the bite and healed without any apparent complications until the day before admission. The patient developed typical symptoms of the disease which responded markedly to treatment with neoparsphenamine administered intravenously. Blood culture was negative but a smear from the ulcerated wound showed the presence of spirilla.

E Hindle

LEPROSY

DE SOUZA ARAUJO, H. C. O exame da linfa cutanea podera servir para os diagnosticos e prognostico da lepra e mesmo para a sua classificacao clinica (Metodo Lleras). [Examination of Cutaneous Lymph in Leprosy]. Acta Med. Rio de Janeiro 1943 Apr-May 11 Nos 4-5 58-62 7 figs on 2 pls. English summary

Examination of the lymph withdrawn by puncture of a gland has been used commonly in the diagnosis of leprosy. The method here described is of more recent date. Professor F. LLERAS ACOSTA initiated it in Colombia in 1937 and it goes therefore by the name of the Lleras Method.

A clamp 24 cm in length has the terminal 7.5 cm curved and toothed with 63 grooves for compression without bruising the tissues. After the skin is cleaned compression of a fold of it 5 cm in diameter at

the edge of the suspected lesion is made up to the first notch in the handle and in five minutes the requisite degree of ischaemia is obtained. Then at three points in the fold puncture with a thick needle is made and in 1 minute there exudes a small drop of lymph at each puncture. This is collected and spread on a slide for bacterial examination. In patients undergoing treatment and who are progressing well the number of organisms in the lymph diminished and so may afford evidence of success in treatment and be of prognostic as well as of diagnostic value.

H Harold Scott

MARIANO J. Estudo anatomo clinico de alguns casos de cancer e lepra [Cancer in Lepers] *1da Med* Rio de Janeiro 1943 Aug-Sept v 11 Nos 8-9 121-6 4 figs on 2 pls English summary (3 lines)

There is a fairly widespread notion that there is some antagonism between leprosy and malignant disease that cancer is rare amongst lepers. The author brings evidence to refute this error citing five cases among patients in two colonies Santa Isabel and Santa Fé Minas Geraes. (1) A woman of 51 years with extensive mixed leprosy and with carcinoma of the right lower eyelid extending to the face. (2) A man of 51 years clinically L1N3 with an ulcerous lesion of the left nostril. The diagnosis of this was Leishmaniasis? cancer and was shown histologically to be the latter. (3) A man of 47 years clinically L3N1 with a carcinomatous lesion very similar to the last. (4) A man also 47 years of age L1N3 with an extensive fibrosarcoma of the right leg. Amputation at the upper third of the thigh was performed but death occurred less than three months later. (5) A man of 38 years dying of adenocarcinoma of the stomach. [The author does not mention the number of patients in the two leper colonies so we cannot gauge the proportion. Of the five recorded one occurred in 1935 two in 1937 one in 1938 and one in 1941.]

H Harold Scott

HELMINTHIASIS

NOGUEIRA RIVERO P. Parasitismo a vermes en Marianao [Helminthiasis in Marianao] *Rev Med Trop y Parasit* 1943 Mar-Apr v 9 No 2 18-22

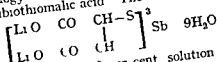
Between August 1937 and December 1942 the author examined 30 019 faecal samples mostly from school children for evidence of helminthic infestation. Of these 18 968 (63.1 per cent) were positive. The commonest infestation was with *Trichuris trichiura* it was the only one present in 12 034 but was present with others in another 5 658 or in 17 692 altogether that is in 93.2 per cent of the positives and 58.9 per cent of the total examined. Next but a long way behind came *Ascaris* which was found alone in 543 alone and in combination in 4 408 or 14.6 per cent. *Ankylostome* was seen in 2 686 (alone in 482) or 8.9 per cent and *Enterobius* in 217 (0.7 per cent) alone in 89. Examination was made by floatation in concentrated salt solution. Various forms of treatment were used hexylresorcinol chenopodium tetrachlorethylene and others but apparently in a small number of

case only 15-4 boys and 1734 girls. The author conclude that the first named hexylresorcinol is wonderfully efficacious in asariasi good in ankylotomiasis poor for Trichuris infestation

H Harold Scott

NATIONAL RESEARCH COUNCIL DIVISION OF MEDICAL SCIENCES
A Summary of Current Literature on Anthiomaline 36 pp 1
hart 63 refs 1943 Aug 18 Prepared by the Office of
Medical Information

This is a useful compilation. In the first section is given an account of the pharmacology of the trivalent antimonial anthiomaline the lithium salt of stibiothiomalic acid. The formula is —



Anthiomaline is applied in 6 per cent solution 10 cc of which contains about 0.01 gm antimony. Dosage agree with the disease concerned but in lymphogranuloma inguinale (that is the disease in which the Frei skin test is positive and known in the United States as lymphogranuloma venereum) it has been proposed to begin with 60 mmm intramuscularly and to increase the dose of the single injections to a possible maximum of 300 mmm until a total dose of 2-4 gm has been reached. The injections are given three times each week and the course may be repeated after an interval of several weeks.

The doses should be regulated according to age and weight (those quoted above are presumably for an average adult). Toxic reactions may take the form of rheumatoid pains arising several hours after the injection or there may be abolition retching vomiting and abdominal pain. Slight fever may be provoked and light anemia is a suspected though not proved sequel. No fatalities attributable to the drug have been recorded.

In the second section the therapeutic action of anthiomaline is considered. It is valuable in lymphogranuloma inguinale and appears to be useful in ulcerating granuloma of the pudenda (i.e. the disease due to infection with a leishman-like organism and in which the so-called Donovan bodies are demonstrable in smears known in the United States as granuloma inguinale).

Some amelioration of the clinical condition has been recorded in filariasis but the results are not so far very striking. In schistosomiasis on the other hand the results are uniformly good and the drug is apparently useful in the treatment of oriental sore (either by local injections or wet dressing) and may be useful in kala-azar. In a few cases of African trypanosomiasis anthiomaline in combination with moranyl gave good results.

Anthiomaline effected a probable cure in a case of infection with *Fasciola hepatica* and is reported as useful in combination with sulphanilamide in the treatment of trachoma.

Sixty three papers have been consulted in the preparation of this summary.

Charles Wilcocks

GOODWIN I C & PAGE J F A Note on the Fate of Stibophen in the Body *Biochem J* 1943 Oct 37 No 4 487-3 1 fig
Stibophen (Fouadin) sodium antimony bis pyrocatechol 3-sulphonate. It is thought that a determination of the relative

rates of excretion in the urine of the antimony and the sodium catechol disulphonate portions of the stibophen molecule would throw some light upon the fate of the drug in the body. The rate of excretion of antimony had previously been determined by the authors by means of a simple polarographic technique [this *Bulletin* 1944 v 41] and the same method was used in the present experiment. For the estimation of the catechol portion of the molecule a modification of Khahl's test for pyrocatechin in urine was used [this *Bulletin* 1936 v 33 9-7]. The urine of volunteers who had received intramuscular or intravenous injections of stibophen (6.3 per cent solution) or sodium catechol disulphonate solution (4.66 per cent) was collected hourly for the first 6 hours and subsequently in 6-12, 12-24 and 24-48 hour fractions and tested as follows. 5 cc of a tenfold dilution of ammonia solution (sp gr 0.880) was added to 5 cc of urine heated in a water bath to coagulate any precipitate and centrifuged. 2 cc of the supernatant fluid was mixed with 2 cc of a freshly prepared solution containing 0.1 per cent FeSO_4 and 0.5 per cent sodium and potassium tartrate (Rochelle salt), then diluted with water to 10 cc and the colour intensity was estimated with a Hilger-Spekler absorptiometer by comparing it with standard solutions of stibophen in urine.

Catechol excretion was shown to be almost complete in about 6 hours whereas the antimony excretion was much slower and followed a different course. The function of the catechol appears to be to keep the circulating antimony in solution in a non-toxic form while it is being absorbed by the liver or excreted by the kidney, meanwhile the excretion of the catechol takes place independently of that of the antimony and at the same rate as that of an equivalent dose of sodium catechol disulphonate.

J. F. Corson

NEWMAN H. P. Transurethral Surgery in relation to Bilharziosis of the Bladder. *J. Urology* 1943 Oct v 50 No 4 440-45 3 figs

CANÇADO J. R. Schistosomose mansoni. Estudo clínico e terapêutico [Clinical and Therapeutic Study of *S. mansoni*]. *Brasil Medico* 1943 Aug 21-28 v 57 Nos 34-35 348-53 20 figs

BRENNER I. W. A Case of Hydatid Cyst of the Lung. *South African Med J.* 1943 Oct 23 v 17 No 20 319-20

CANÇADO J. R. Incidência da estrogiloidíase e tubagem duodenal [Incidence of Strongyloides in Duodenal Contents]. *Brasil Medico* 1943 Sept 4-11 v 57 Nos 36-37 370-71 4 figs

Cançado has previously reported an incidence of Strongyloides infection of 8.6 per cent on the basis of examinations of faeces at the Laboratório Carlos Chagas Bello Horizonte [see also this *Bulletin* 1942 v 39 5 where the incidence is given as 8.2 per cent]. He has now examined the duodenal contents of 1142 persons and found larvae of *S. stercoralis* in 103 (9 per cent). The infection is more common in the poorer people.

Charles Wilcocks

OLIVER GONZALEZ J. Antigenic Analysis of the Isolated Tissues and Body Fluids of the Roundworm *Ascaris lumbricoides* var. suum. *J. Infect. Dis.* 1943 May-June v 72 No 3 202-12 9 figs [16 refs]

The author begins with a brief summary of earlier work which has shown that antibodies appear in animals infested with *Ascaris* or

artificially immunized to it with extracts of the adult whole worm or of its isolated tissues. Marked tissue specificity was found by these workers: antibodies produced in rabbits by injections of suspensions of *Ascaris* cuticle muscle and so on reacted at the highest titre to the homologous tissue. In this paper the author undertakes a more detailed study of the antibody nature of acquired immunity to *Ascaris* [cf. also WRIGHT and OLIVER-GONZALEZ below]. He also seeks to determine which of the antibodies in isolated *Ascaris* tissues are involved in the stimulation of antiparasitic factors in the host.

The methods used for the preparation of these tissue antigens are described. Precipitin disk tests were done with undiluted sera of infested rabbits, overlaid with antigens at dilutions of 1:500 to 1:21,600. Living larvae of *Ascaris* immersed in these rabbit sera were incubated at 37°C in vaselined hanging drops and the effect of the sera upon them was observed.

For detail of the results the paper must be consulted. In general, the author found that sera of rabbits infested with *Ascaris* eggs or injected with extracts of powdered whole *Ascaris lumbricoides* of the pig caused precipitates round the mouth anus excretory pore and cuticle of the larvae immersed in them [cf. TALIAFERRO and SABLES this Bulletin 1943 v. 40: 319]. Excellent photographs of these larvae are given. These precipitates began to appear about 24 hours after the larvae were immersed in these sera: these sera also immobilized and killed a large percentage of larvae (41 per cent. of 500 larvae in one series of experiments). Normal sera did not have these effects. Superinfection did not increase the effect on the larvae and it did not increase the precipitin content of the serum. The larvae were obtained from the lungs of guinea-pigs infested with *Ascaris lumbricoides* of the pig and the author recognizes that in this host the pig *Ascaris* does not develop further than the larval stage in the lung but he suggests that the reason why it does not complete the intestinal stages is that antibodies immobilize and kill the larvae in the lung where macrophages destroy them.

When rabbits were injected with extracts of isolated tissues of *Ascaris* (egg muscle cuticle intestine sperm coelomic fluid) the anti-egg sera of these rabbits were the only ones which immobilized and killed the larvae immersed in them and caused precipitates at the mouth anus excretory pore and round the cuticle. The anti-egg antibody was the most important of these isolated tissue antibodies. It and the anti-cuticle antibody produced the highest precipitin titres. The anti-egg antibody was still present in the sera 126 days after infestation: the other isolated tissue antibodies disappeared from the sera on about the 44th day after infestation. This may explain the presence of precipitins in non-infested individuals which has been reported by many workers and it is possible that extracts of *Ascaris* cuticle muscle intestine etc. are more reliable in diagnosing actual present infection than extracts of the whole worm.

Antibodies to all the tissue antigens also appeared in the sera of rabbits artificially immunized with extracts of whole worm but each tissue anti-antibody only its homologous antibody. This confirms earlier work.

The author discusses the part played by specific antibodies in acquired immunity to *Ascaris* and compares his results with those obtained by others who have used *Ascaris*, *Trichinella spiralis*, *Vipera*, *Peromyscus*, *Ancylostoma caninum* and *Strongyloides* *ratti*. G. Lapag

WRIGHT G G & OLIVER GONZÁLEZ J Electrophoretic Studies on Antibodies to *Trichinella spiralis* in the Rabbit *J Infect Dis* 1943 May-June v 72 No 3 242-5 [17 refs]

Earlier work by OLIVER GONZÁLEZ [*J Infect Dis* 1941 v 69 254 referred to by title in this *Bulletin* 1942 v 39 627] indicated that the infestation of rabbits with *Trichinella spiralis* produces in their sera two types of antibody. The intraduct type affects the adult worms *in vitro* and partially protects rats against the intestinal stage of infestation. It appears about the 15th day after infestation is lost by the 50th day but reappears and reaches its highest titre after repeated infestations. The antiluminal antibody gives no protection against the intestinal infestation and is not increased by repeated infestations.

This paper describes the authors studies of rabbit antibody to *Trichinella* by electrophoretic methods. Rabbits infected with *Trichinella spiralis* showed an increase in the proportion of gamma globulin in their serums as immunity to the infestation developed. The increase was not maintained by superinfection. Antibodies both against the larvae and against the adults were demonstrated in the gamma globulin but not in the other electrophoretic components of these serums.

G Lapage

MELCHER L R An Antigenic Analysis of *Trichinella spiralis* *J Infect Dis* 1943 July-Aug v 73 No 1 31-9 2 figs [31 refs]

The author set out to isolate and identify the chemical fractions of larvae (not adults) of *Trichinella spiralis* which are immunologically active.

After a brief survey of the methods and results of earlier workers the author describes his methods of obtaining larvae more suitable for this work than those used by these workers. Larvae digested out of hog's muscle were repeatedly washed in sterile saline until the negative biuret tests obtained from the washings indicated that the larvae were free from host protein. The larvae were then dried in the frozen state to prevent autolytic changes and were lyophilized to facilitate rapid and thorough extraction with lipid solvents. Proteins in a lyophilized state are much less subject to denaturation so that their antigenic structure is less likely to be altered.

For the methods used for the isolation of the six chemical fractions used the paper itself must be consulted. These fractions were: (1) polysaccharide (2) lipid (3) defatted insoluble residue pH 8.3 (4) alkaline extract (5) acid insoluble protein (6) acid soluble protein.

Precipitin tests were done with four of these fractions and the sera of rabbits artificially infected with *Trichinella spiralis*. The lipid fraction and defatted residue could not be used because they were insoluble in saline. These tests showed that the polysaccharide and acid soluble protein are the potent precipitating antigens. The acid insoluble protein gave no precipitate. The alkaline extract is merely an earlier stage of the acid soluble fraction and contains also acid insoluble and polysaccharide fractions. Probably for this reason its titre was lower.

Skin tests done with all the six fractions on the same rabbits 30 days after infection indicated that these were of the delayed type appearing 24 hours after injection of 0.1 ml of antigen. They were

positive only with the acid-soluble fraction and the alkaline extract again the alkaline extract showed a lower titre. No reaction occurred with the acid-insoluble and polysaccharide fractions. The lipid and defatted residue fractions gave non-specific reaction with both infected and normal rabbits.

Precipitin tests with the sera of rabbits immunized with the polysaccharide and acid-soluble protein fractions and the alkaline extract and with alkaline extract of lyophilized powdered adult *Ascaris* showed that with their homologous sera the acid-soluble protein fraction gave a positive reaction at a dilution of 1:128,000 the polysaccharide at a dilution of 1:64,000 and the alkaline extract at a dilution of 1:20,000. The *Ascaris* alkaline extract reacted at 1:256 but there was no evidence of a common antigen between adult *Ascaris* and *Trichinella* larvae as stated by Baron and Branner in this Bulletin 1943 p. 40-47.

The results indicate that the acid-soluble protein fraction is the one responsible for positive skin and precipitation reactions which earlier workers have regarded as indicative of larval infection. Its electrophoretic pattern was found to show only three components at the pH and ionic composition of the phosphate buffer used. The extremely slow mobility of the slowest component suggests that it may be a polysaccharide.

DEFICIENCY DISEASES

Fox, F. W. Some Nutritional Problems amongst the Bantu in South Africa. Reprinted from *Practical Nutrition* Vol. 14, No. 3, 1938. Summary appears in Bulletin 1943 p. 14.

The majority of the Bantu population in South Africa live in rural areas. In the past their diet was very simple consisting of maize milk, wild-meat and kaffir beer and the author demonstrates clearly that with these foods the natives were able to enjoy a diet of high nutritive value. Comparative small changes have been made in their diet but about serious deficiencies in diets as simple as this because each food contributes some dietary factor absent from the others. Destructive methods of farming and contact with Western civilization are revolutionizing the food habits of the Bantu people and the outcome seems likely to be disastrous. The maize crops are becoming smaller and they are reared only to buy them back again later during a time of shortage for a much higher price than the original price. The first and most urgent need seems to be for an adequate supply of imported grain at reasonable prices. There is also a great decrease in the amount of milk available owing to the steadily increasing demand for milk. For the same reason meat is becoming more and more scarce and possibly kaffir beer is the only food which is still being made and used in these areas just as it was in former days.

Besides the diet becoming worse because of de-vegetation of the land the more sophisticated natives are drifting steadily in the direction of the imported food which is refined meal, white bread and sugar. The change is being hastened by a widespread advertising campaign.

There seems to be a general agreement that while the people exhibit a remarkable power of adjustment enabling them to survive periods of famine and starvation their physique is gradually deteriorating. Mortality is high in early life 15-25 per cent of the children die during the first year 25-38 per cent before reaching two years and 30-60 per cent before they are 18 [See also this *Bulletin* 1943 v 40 865]

I M Haddowson

VENOMS AND ANTIVENOMS

MACHT D I Comparison of Effects of Cobra Venom and Morphine on Unanaesthetized Cat *Proc Soc Exper Biol & Med* 1943 June v 53 No 2 225-7 3 figs

The effects of morphine on the brain and neuro muscular activity and on the pupil are in the case of felines the opposite of what occurs in man. It excites the brain of cats in proportion to the dose and dilates the pupils. Since morphine and cobra venom are both used as analgesics the author thought it would be interesting to compare them in their actions on unanaesthetized cats. He used a cobra venom free from haemotoxic and cytotoxic principles and from protein in other words cobra neurotoxin.

First as regards general behaviour. Whereas morphine induced excitement increasing with the dose cobra venom in small doses 5-10 mouse units per kgm had no obvious effect beyond producing a mild euphoria (as with catnip). Larger doses 10-20 units were sedative producing drowsiness and 40 units were depressant and caused tremor and unsteady gait. In short the effects of cobra venom were the reverse of those due to morphine.

Secondly effects on the pupils. In cats small doses of morphine (1 mgm per kgm) produced mydriasis and larger doses greater dilatation and failure to react to light. Cobra venom in small doses of 5 m u had no effect larger such as 5-20 m u caused myosis starting in an hour and persisting up to 24 hours.

Myosis in man resulting from morphine is due it is believed to central action and increase of oculomotor tone. Local application of venom had no effect on the iris of the cat's intact eye but the negative results of experiments on isolated iris muscle *in vitro* showed that the myosis effects of venom are central in origin and when the cats were decerebrated by severing the upper brain just below the thalamus leaving the oculomotor nuclei intact cobra venom when injected narrowed the pupils. The sequence of events may be illustrated by one example.

Morphine—A cat weighing 2.3 kgm had pupils 2-3 mm in width at noon before experimentation. At 12.15 p.m. 30 mgm of morphine sulphate were injected intramuscularly. At 12.40 p.m. animal very restless and excited pupils circular maximal dilatation. The excitation continued and quiet was not restored till next day and the pupils were still dilated but becoming smaller 6 mm in diameter.

Cobra venom—Cat weighing 2.8 kgm pupils 5 mm at noon. At 12.10 p.m. 30 m u venom injected at 12.40 p.m. animal quiet pupils

same width 2 p.m. pupil 2 mm at 3 p.m. 1-2 mm and animal somnolent. Next day the behaviour was normal and pupil were dilating again 3 mm but not yet back to normal size.

H. Harold Scott

KHAN, T. A. Evaluation of Sodium Bisulphite and Ascorbic Acid as Antidotes of Cobra Venom. *J. Indian Med. Ass.* 1943 Aug. 12 No. 11 313.

GHOSE, D. and CHALLHURI. *ibid.* 1942 133-405] found that reducing agents such as sodium bisulphite and ascorbic acid when mixed with cobra venom *in vitro* were capable of effecting considerable reduction of toxicity. The author has also estimated the use of these substances in the treatment of experimental injection of cobra venom. Of the specimen of venom used the smallest dose which was always fatal to dogs was found to be 0.6 mm per kgm. and this dose was injected intramuscularly. Sodium sulphite or ascorbic acid in doses of 0.5 to 1.0 gm. was injected intravenously 5-10 minutes after the injection of the venom. All the dogs died with the usual symptoms of cobra poisoning and after the usual interval. This form of treatment appears therefore to give no sign of usefulness. Charles Wilcocks

DE MAGALHAES, O. & GUIMARAES, R. Esorpionismo—Alguns dados estatísticos e observações de acidente. *Scorpion Sting—Statistical and other Data.* *Mem. Inst. Biol. Equival. Dias.* Belo Horizonte 1939 & 1940 3 & 4 137-94 5 figs on 4 pl.

The authors refer in passing to previous records they made on the subject of scorpion stings in 1929 but say that the present article is of much greater importance because the number of cases on which their observations are based is much greater (104 in the former 2449 in the present) the intrapalmar method of administration of antivenene has proved vastly superior to the subcutaneous and intravenous routes and much less of the serum is needed.

Cases of scorpion sting in Belo Horizonte are commonest in the month of October as the following table for the two years 1939 and 1940 shows—

Month	1939	1940	Total
January	46		103
February	39	43	82
March	39	52	91
April	53	5	7
May	43	45	88
June	27	44	4
July	40	5	92
August	28	58	86
September	54	66	140
October	88	116	214
November	47	9	137
December	60	84	144
	530	408	1338

[The totals given in the tables throughout this article are more often wrong than right a fact which engenders some doubt as to the correctness of the constituent figures as these cannot be checked]

The majority of the victims were young children living most of the time in or around the house where the scorpions hide and playing in the passages and gardens the scorpions lurk in the ivy on the walls and one of the prophylactic measures proposed is destruction of the ivy. The sting is not often fatal except in the young but in this series there were 145 deaths of the fatal cases only 37 had received anti serum and some of these were patients almost moribund when it was given and others received it several hours after the accident. The authors regard 20 of the 37 as wrongly interpreted as failures of serum.

The poison acts on the nervous system and kills by its effect on the cardiac and respiratory centres in the bulb death may take place even within half an hour. Much of the paper is given up to description of the symptoms in individual patients one may be detailed as typical of a case ending fatally.

A boy of 2 years was stung on the finger by an adult *Tityus serratus* at 3.30 p.m. He was seen a quarter of an hour later and was given 30 cc antiserum intramuscularly and subcutaneously [although in their opening statements the authors stress the much better success resulting from the intraspinal administration] and 10 cc more at 5 p.m. The child had a slight cough marked rapidity of respiration rhinorrhoea and frothy expectoration pulse 140 regular marked prostration and vomiting intense pain distress crying out at intervals profuse sweating generalized *cutis anserina*. Soon after 5 p.m. the vomiting ceased but the patient was livid and cold for some little time longer then warmth returned but at 11 p.m. the agitation and distress became very great and thirst intense 20 cc antivenene given. Sweating ceased dyspnoea severe pupils dilated general tremors restlessness at 2.30 a.m. marked delirium meningismus rigidity of limbs and neck nystagmus became quieter and died at 3 a.m. less than twelve hours after the accident.

H. Harold Scott

SMITHERS R. H. N. The Distribution of the 'Knopiespinnekop' (*Latrodectus indistinctus*) South African Med J 1943 Sept 25 v 17 No 18 293 1 map

Smithers has published a map showing the distribution of *Latrodectus indistinctus* and of its variety *karooensis* in the Cape Province of South Africa. He mentions the success which has attended treatment of persons bitten by the former by means of antivenene prepared by the Union Health Department.

Charles Wilcocks

EAST AFRICAN MED J 1942 Nov v 19 No 8 262-3 Two Fatal Cases of Bee Stings

Two Indian boys were attacked by bees at 5.15 p.m. and were admitted to Dodoma Hospital Tanganyika Territory at 7.15 p.m. and seen by the doctor at 8 p.m. They had been stung all over one boy having 400 stings on the face head and neck alone. Both were in a state of profound shock with feeble heart sounds rapid pulse cold limbs and subnormal temperature. The skin was much swollen especially on the face. Treatment for shock was given immediately but the

patient gradually became comatose and died next morning at 8 a m and 9 a m respectively. Permission for autopsy was not obtained.
J F Corson

DERMATOLOGY AND FUNGUS DISEASES

LIVINGOOD C S ROGERS A M & FITZ HUGH T Jr Dhubie
Mark Dermatitis. *J Amer Med Ass* 1943 Sept 4 v 123
No 1 23-6 5 figs.

A careful study thrown into light on one at least of the conditions hitherto grouped under the term Dhubie's itch. There is a general tendency to class all epiphytic dermatitis in the tropics under this head and to blame the poor dhubie for introducing it.

The authors have shown that a form of dermatitis venenata is commonly due to the use of a fluid from the nut of the *ral* or *bella gutti* tree *Semecarpus alacina* with which the native washerman marks the clothes for laundering. At the 70th General Hospital 11 cases occurred among 55 officers and 41 among 544 men. All are not therefore equally susceptible. The symptoms caused are local pruritus in a few hours after contact followed by dermatitis of varying degree from erythema to oedema vesiculation oozing and crust formation. In the cases seen by the authors the sites involved were the neck waist line ankles feet and lower third of the leg. The marking of the linen or socks is done by using the juice obtained by pushing a pin through the capsule of the nut to the brown or black fluid within. Such marks will withstand half a dozen washings or more. By patch tests it was shown that the juice from green nuts was much more potent than that from older and dried nuts. Boiling the marked clothes will not remove the irritant and in fact in sensitive persons appears to enhance the effect. Exposure to sunlight and even to solvents such as ether acetone 95 per cent alcohol and white gasoline do not reduce the sensitizing properties. Fluids from different nut vary greatly in potency hence the varying incidence of cases among different dhubies etc etc.

In their conclusions the authors state: We believe it most unlikely that cutaneous fungous infections are transmitted by clothing washed by dhubies and therefore urge that the use of the term dhubie itch as a synonym for tinea cruris and epidermophytosis be discontinued.

[Perhaps it is too soon to do away altogether with the term dhubie itch for though the authors have done good work in separating *ral* nut dermatitis from epiphytic conditions they have not shown that all dhubie itch is due to this. Probably the commonest sites of dhubie itch are the crutch and the axillae and the parts of the linen coming into contact with these areas are not those where the dhubie puts his identification mark.

H H Hoot

[*Semecarpus alacina* contains powerful vesicants and causes blistering within 12 hours. It is said to be used by malingerers in India. It is called *Chakou* in Assam and *Chela* in India. The word *ral* is a general term for several kinds of trees in India.—Ed

GOLDSMITH N R Dermatitis from *Semecarpus Anacardium* (Bhilawanol or the Marking Nut) spread by Contaminated Mail *J Amer Med Ass* 1943 Sept 4 v 123 No 1 27 1 fig

A bottle containing Bhilawanol Oil the juice of the marking nut tree *Semecarpus anacardium* in transit by post came unstoppered and other pieces of the mail were soiled with it Sixteen employees who came in contact with the juice complained of itching and burning of the hands arms and face and developed a dermatitis of varying severity—a dermatitis venenata Patch tests with the oil diluted 1:1000 gave strongly positive reactions in 72 hours The pericarp of the fruit of the tree contains a dark brown to black corrosive juice which is used for dyeing and for marking linen—hence the name [see above] The juice has been found by analysis to contain a monohydroxyphenol (semecarpol) a dihydroxy compound $C_{15}H_{10}O$ (bhilawanol) and a tarry corrosive residue but no anacardic acid cardol catechol or anacardol
H Harold Scott

LIEBERTHAL E P Pinta (Mal del Pinto, Carate) in Continental United States Report of Three Cases with Late Manifestations and Review of the Salient Features of the Disease *J Amer Med Ass* 1943 Nov 6 v 123 No 10 619-24 3 figs [11 refs]

An instructive article which might well constitute a clinical lecture on the subject of *mal del pinto* with three typical illustrative cases The author does not bring forward anything fresh but stresses the differences which may be observed between Cuban and Mexican cases especially the regularity and prominence of the cutaneous lesions the punctate palmar and plantar hyperkeratoses [It is perhaps a pity to speak so often of the vitiligo-like areas of pinta as the author does since vitiligo is one of the most important of the conditions requiring to be differentiated from *mal del pinto* and the distinction is often quite definite see this *Bulletin* 1944 v 41 66]
H Harold Scott

JACOBSON C F Jr & DOCKERTY M B Blastomycosis of the Epididymis Report of Four Cases *J Urology* 1943 Aug v 50 No 2 237-48 5 figs

Gilchrist's disease caused by *Blastomyces dermatitidis* occurs in two clinical forms (1) a cutaneous blastomycosis tending to progress as a chronic or subacute ulcerative process responding well to iodide medication and irradiation and (2) a systemic blastomycosis involving the viscera especially the lungs and tending to a fatal issue The systemic form may be primary or may develop by extension from the cutaneous form

The authors describe four cases of the disease with involvement of the epididymis a complication sufficiently unusual to merit special report The cases are dealt with mainly from the viewpoint of the genito-urinary surgeon and the diagnosis was based on the discovery of the causative fungus in sections of the lesions in the epididymis No reference is made to isolation of the fungus in culture In all four cases the skin was involved the common lesion being a subcutaneous nodule painless at first which broke down and ulcerated on the surface leaving a discharging sinus In three of the patients the skin lesions were generalized over the body and in the other localized to the face

In all cases the skin lesions yielded to intensive potassium iodide medication by the mouth and local X ray and ultraviolet ray therapy but despite the improvement in the skin lesions the epididymal and probably other visceral lesions tended to progress even during treatment. On cessation of the treatment before cure new skin lesions quickly developed. One patient was definitely cured but two died. At autopsy it was found that one had primary cutaneous blastomycosis with subsequent extension to the viscera but not the lungs the other had primary pulmonary blastomycosis of some duration which became generalized in the viscera and skin and assumed an acute fulminating character. The remaining two cases may have been primary pulmonary infection.

J. T. Duncan

Corr. O. G. F. post c. n. Brazil Sporotrichosis in Brazil } Brasil
Medico 1943 A 1 8 57 \ 34-35 343 7 [111 ref.]

PIMENTEL IMBERT M. F. Broncomonilíasis. Reporte de un caso fatal
[A Fatal Case of Bronchomoniliasis] *Rev. Med. Trop. y Parasit.*
1943 Mar-Apr 1 9 No 2 16-18

Bronchomoniliasis is usually regarded as an accidental or incidental affliction of the respiratory tract in which the sputum contains *Monilia albicans*. It causes little or no constitutional disturbance and clears up spontaneously. At times as in the case described here by the author the condition may be grave and even fatal after symptoms of fever, sweats, pain in the chest and cough with mucopurulent sputum perhaps blood stained accompanied by dyspnoea and cyanosis.

The present case the first in Santo Domingo occurred in a negro 39 years of age a cook by occupation who had lived in the district for 12 months.

On admission to hospital he gave a history of high fever, shivering, vomiting, intense headache and general pains. His condition was obviously serious. He was of an ashy grey colour the sclerotics were jaundiced slightly there were scattered râles in the lungs the liver was enlarged to two fingers breadth below the costal margin and the gland of the neck and groin were enlarged. Blood examination showed red cells 4 030 000 per cmm haemoglobin 75 per cent leucocytes 22 500 (83 per cent polymorphonuclears 7 per cent lymphocytes and 10 per cent monocytes). A fortnight later the red cells were about the same 4 020 000 white 15 250 per cmm and 93 per cent polymorphonuclears. Sputum showed abundant *Monilia* and growth was obtained on Sabouraud medium and the patient's serum agglutinated it up to 1:640. During his time in hospital the temperature ranged between 36.7 and 40.8 C. and the pulse between 120 and 150 respirations per minute. The sputum was thick tenacious mucopus never containing blood. Death took place 17 days after his coming to hospital. Treatment consisted of urotropine and sodium salicylate in small doses then digitalis and lastly sodium iodide too late and in inadequate doses.

Autopsy revealed trachea and bronchi red and oedematous and containing blood stained fluid the lungs were voluminous and congested and exuded bloody serum on section the pleura were thickened and adherent. *Monilia* was isolated from the exuding serum.

H. Harold Scott

PERRIN T G & MARTÍNEZ BÁEZ M Nota sobre el primer caso de histoplasmosis en México [First Case of Histoplasmosis in Mexico] *Rev Inst Salubridad y Enfermedades Trop* México 1943 Mar v 4 No 1 79-87 10 figs on 5 pls [21 refs]

Recent observations having shown that histoplasmosis is a more common disease than has been suspected hitherto the authors have been led to place on record the details of a case which was presented by them before the National Academy of Medicine of Mexico in 1937. The case a fatal one was in a man 68 years of age who suffered from ulcerative pharyngitis and bronchitis. Material from the pharynx was removed by biopsy and in preparations made from it *Histoplasma capsulatum* was discovered. The organism was also found in sputum from the lungs and in cells in the urinary deposit. There being no specific remedy for the disease various drugs were tried in vain. The infection was evidently generalized as evidenced by the pharyngeal and pulmonary condition and the cystitis.

C M Henson

MISCELLANEOUS

COLONIAL OFFICE Colonial Research Committee Progress Report 1942-1943 [HAILEY Chairman] Cmd 6486 26 pp 1943 London H M Stationery Office [6d]

BUL INST HYG MAROC 1942 v 2 91-142 Rapport sur l'activité des Services de la Direction de la Santé de la famille et de la jeunesse pendant l'année 1942 [Report on the Health Services of Morocco during the Year 1942]

Medical and sanitary work during 1942 was much handicapped by shortage of staff equipment and transport owing to the war. The staff included 251 doctors and 149 European nurses as well as some hundreds of trained native assistants. The population of Morocco about 6½ millions is composed of Mohammedans, Jews and Europeans.

The diseases recorded in out patients and in patients are grouped as injuries (30-40 per cent), fevers (40-50 per cent) and venereal diseases (nearly 20 per cent).

Infectious and contagious diseases—The increase in these diseases is attributed to overcrowding, less and poorer food, lack of soap and difficulties in carrying out town sanitation. The deaths from infectious and parasitic diseases have more than doubled since 1940, the chief cause being an outbreak of typhus fever. *Malaria* is widespread and in 1941 there was a serious epidemic in the Atlantic coastal regions. *Typhus fever* [of the classical louse borne type] increased in incidence from 1 666 cases in 1941 to 28 802 in 1942, 556 were in Europeans. Other infectious diseases were less prominent: *smallpox* 2 078 cases including about 50 Europeans; *rubella* 1 254; *scarlet fever* 64; *diphtheria* 359 mostly mild cases; *cerebrospinal meningitis* 20. The figures for *tuberculosis* are unreliable, diagnosis being mainly clinical. 7 951 cases are recorded with 2 676 deaths, 124 deaths being in Europeans. About 77 000 cases of *trachoma* were diagnosed, the greatest prevalence being at Marrakesh. There were 976 cases of *rabies* in natives and 611 in Europeans, nearly all were caused by

dogs bites usually by stray dog but cats (96) donkeys (45) cattle (1) horses and mules (14) rats pig camel a rabbit and man (10) also transmitted it. Syphilis was the chief venereal disease. 20 000 cases being diagnosed. Among 25 000 cases of dysentery less than 100 were bacillary.

Special prophylactic measures—*Malaria* Prophylactic measures were continued but were hampered by shortage of drug and larvicides and lack of transport. *Veneral diseases* brothels are inspected. 20 000 women were treated during the year. *Smallpox* over 500 000 vaccinations were done. *Plague* there was a decrease in incidence from 2 337 in 1941 to 583 in 1942 as prophylactic measures. 80 000 vaccinations were done and over 60 000 rats were caught.

Other activities recorded in the report are Port Hygiene various habitable and making and building work projected and accomplished.
J. F. Co. son

SCOTT H. H. The Influence of the Slave-Trade in the Spread of Tropical Disease. *Tan. R. v. Soc. Tr. p. Med. & Hy.* 1943 Dec. v. 37 No. 3 169-88 7 fig. on 1 pl.

In the Presidential Address to the Royal Society of Tropical Medicine and Hygiene Sir Harold Scott has taken a subject peculiarly his own as readers of his *History of Tropical Medicine* will know. He dealt with the slave trade in relation to the spread of disease and the paper bears evidence of the wide historical research he has undertaken. After a general account of the slave trade he discusses yellow fever considering at length the question of the origin of this disease whether in the Old World or in the New. On the whole he inclines to the view that Africa was its original home and that it spread thence to America. Leprosy was probably introduced into America by the Spaniards and Portuguese but there can be little doubt that the influx of slaves from the heavily infected peoples of tropical Africa contributed largely to the prevalence of this disease in the Americas. Yaws was probably present in the West before the days of Columbus but during the period of slave trading fresh cases must constantly have been brought from Africa.

African trypanosomiasis is in a different category depending as it does on cyclical development of the trypanosomes in *Glossina*. These flies are not found in America and though patients with negro lethargy were carried there no extension could take place. Dengue may have been transported from Africa to Guadeloupe there is some reason to think that the outbreak of *coïp de terre* in 1635 was an outbreak of dengue.

Of the helminthic infections nothing is certainly known of the origin of *Huchereria bancrofti* but it is more than likely that *Acanthocheilonen perstans* and *Loa loa* were carried from Africa to America and that the slave trade played a great part in this transfer. It seems to be accepted that *Dracunculus medinensis* and *Schistosoma mansoni* were similarly carried to and fostered in America.

Finally the akeet *Blighia sapida* is a tree indigenous to West Africa which was carried to Jamaica in a slave ship in 1778. [Readers will remember that it is to Sir Harold Scott that the credit for relating the highly fatal vomiting sickness of Jamaica to the eating of the unripe fruit of this plant is chiefly due.]

[The address betrays the wide interests of an enquiring mind its subject is not remote from present-day problems for the massive and

rapid movements of large numbers of people about the world as a result of war may bring results not unlike those of the slave trade in relation to the spread of disease.]

Charles Whitcomb

- 1 CHARTERS A D The Causation of Tropical Ulcer *Trans Roy Soc Trop Med & Hyg* 1943 Dec v 37 No 3 205-17 [16 refs]
- 2 BUCHANAN J A C Tropical Ulcers in association with Food Deficiency [Correspondence] *East African Med J* 1943 Nov v 20 No 11 394

1 Among many conditions which have been thought to cause tropical ulcer the author finds from a review of some of the literature that there is a good deal of evidence in favour of dietary deficiency being responsible

The distribution of cases of tropical ulcer among African troops who were admitted to an East African hospital was remarkable during the period from November 20th 1942 to May 20th 1943 out of 570 East Africans there was one case of tropical ulcer and that case was doubtful while among 292 Somalis there were 143 cases All were living under the same conditions except in regard to diet that of the Somalis was relatively and actually deficient in vitamin A and riboflavin while both diets were deficient in calcium

Tests were therefore made by giving calcium cod liver oil (vitamin A) or condensed milk (riboflavin) to different groups of patients receiving the Somali diet Other groups were given coramine (as a substitute for nicotinic acid) and ascorbic acid respectively The only local treatment was a dry dressing applied twice a day The ulcers were measured every three days

It was found that the greatest and quickest improvement occurred in those receiving calcium cod liver oil and condensed milk A trial of campolon on another patient eliminated riboflavin as a cause of the improvement and it was concluded that the good effect of the condensed milk was due to its calcium To discriminate between vitamins A and D in the cod liver oil 50 patients were given peprika (sweet pepper) which is rich in carotene 52 (94 per cent) improved

Since the diet of the East Africans also contained little calcium the tests suggested that a deficiency of vitamin A was the cause of the ulcers in the Somalis moreover the disease did not attack Somalis of one unit whose diet included ghee substitute containing 3500 I U of vitamin A per ounce the patients however showed none of the classical signs of vitamin A deficiency such as Bitot's spots xerophthalmia hemeralopia or phrynoderma The deficiency theory does not conflict with that of infection as deficiency may predispose to infection The author recommends the addition of $\frac{1}{8}$ oz of peprika to the daily diet alternatives are green chilli lettuce watercress and spinach [Red palm oil rich in vitamin A might also be used where available see this *Bulletin* 1943 v 40 331 For an account of beriberi among Somali troop *ibid* 1943 v 40 806]

2 The writer comments on a reference by ANDERSON [*Bulletin of Hygiene* 1944 v 19 135] to the occurrence of tropical ulcers among these troops Buchanan points out that the East African troops wore boots and puttees while the Somalis wore sandals only until puttees and socks were issued to them to protect their legs and ankles He closely investigated these cases and became convinced that trauma as a direct

cause of the ulcers could not be discounted though a change from their natural diet was no doubt a predisposing cause. He also states that calcium in the form of bone-meal was not in fact added to the East African native diet in the northern command. [The last statement is confirmed in an editorial note.]

J F Corson

KELLERT E. Rhinoscleroma. Report of a Case. *New England J of Med* 1943 Oct 21 v 223 No 17 647-50 5 figs [11 ref 1]

Rhinoscleroma is rarely seen in the United States the few cases have mostly occurred in foreign born persons. It is however becoming more often recognized owing to more frequent biopsy and improved diagnosis. The patient whose case is described in this paper was a Pole aged 66 years who had lived in Massachusetts for many years. When first seen in 1928 he showed a tender but not painful granular indurated lesion of the hard and soft palate with greyish areas apparently cicatrices. The uvula was absent. The post pharyngeal wall was involved. The palate and contiguous buccal mucosa were very hard (suggesting scirrhus carcinoma) and bled freely on manipulation. The nose was not involved though there was a foul discharge from the nostrils. Biopsy specimens revealed typical changes.

The patient was not seen again till 11 years later in 1939. On account of difficulty of breathing he had had a tracheotomy done some months before. The oral cavity had contracted from the cicatrized palate being drawn towards the base of the tongue the tonsils could not be seen. A second biopsy revealed changes similar to those of the first. Death occurred about 20 years after the symptoms first appeared. Permission for autopsy was refused. *Klebsiella rhinoscleromatis* was grown on both occasions and the original culture had retained its characteristics over a period of 14 years.

H Harold Scott

EADY J T & KAHN R M. Favism. Report of a Case. *US Naval Med Bull* 1943 Nov v 41 No 6 1720-24

A general account of favism with description of a typical case of a fairly severe attack in a private of the U.S.A. of Spanish stock and aged 31 years. His symptoms were quite characteristic: headache and general pains, chills, moderate rise of temperature (101 F) and haemoglobinuria with nausea, vomiting, jaundice, anaemia and asthenia. Treatment comprised epinephrin at the onset to combat the dyspnoea, sense of oppression in the chest and collapse, transfusion of whole blood 3 000 cc in the first week and of plasma 500 cc during the phase of shock, 5 per cent dextrose intravenously freely during the first few days, liver extract intramuscularly and later iron in large doses.

The important point in diagnosis is to bear the possibility in mind. The condition is very rare in the United States but should be constantly thought of by medical men serving in the Mediterranean. The rarity in the United States and other countries is ascribable to the fact that there does not seem to be any species of *Vicia* native to those countries but as *V. faba* is the authors state now being cultivated in the States more cases are likely to be encountered. [See also this Bulletin 1942 v 39 2/9 639.]

H Harold Scott

CLELAND J B. Plants including Fungi Poisonous or otherwise Injurious to Man in Australia. *Med J Aust* 1943 Aug 28 v 9 No 9 161-4 [15 ref.]

HUFFAKER C B & BACK R C A Study of Methods of Sampling Mosquito Populations *J Econom Entom* 1943 Aug v 36 No 4 561-9 [11 refs]

In order that mosquito control measures may be intelligently directed it is desirable to know the relative abundance of various species in the adult population. Most of the methods employed for sampling the natural populations have been criticized on the ground that they do not give representative samples.

One of the most popular devices for catching mosquitoes is the New Jersey mosquito trap but it is pointed out that owing to the complex behaviour patterns of mosquitoes it is unlikely that any one apparatus can present conditions equally attractive to all the prevailing species. The traps usually contain a source of light and carbon dioxide as attractants and a fan. By using each of these alone and in various combinations and by comparing the catches so obtained with each other and with the results of other methods (e.g. counts of mosquitoes attempting to feed, sweeping the air at intervals, insects resting in barns and barrels) it was thought that it might be possible to develop a correction factor which could be applied to the results of the New Jersey trap catches so that a more accurate picture of the relative numbers of different species occurring naturally could be obtained.

The percentages of some 20 species caught by the different methods show striking divergences. For example *Anopheles quadrimaculatus* varied from 8.4 per cent in traps with light and carbon dioxide to 20 per cent in air sweepings and to over 90 per cent in barns and barrels.

Inspection of the results led to the conclusion that traps containing various combinations of light and carbon dioxide showed differences in their relative attractiveness to species according to prevailing conditions. That is to say the contrast between the condition presented by the trap and those of the surroundings is important. Isolated traps with no attractants collect the most representative samples but in numbers too small to provide data for correction factors except when the population density is very high. However correction factors for several species are presented—these are obtained by determining the relative percentages of several species recorded for the trap without attractants and say with a source of light. From these two values the error introduced by the use of the slight attractant is easily estimated and the factor devised is used for correcting future results.

W. I. L. David

IEBÉLO A & DE CARVALHO PEREIRA MARIO Estação anti malária de Lourenço Marques Culicíni (Diptera Nematocera) da colónia do Moçambique [The Culicines of Mozambique] Reprinted from *Moçambique* 1943 Apr-June No 34 81-90 1 fig

OVIEDO BUSTOS J M Coccidiosis in Human Subjects (*Isospora bigeminum*) *Arch Argentinos Enferm Aparato Digest y Nutric* Buenos Aires 1943 Feb-Mar v 18 246 [Summary taken from *J Amer Med Ass* 1943 Oct 16 v 123 No 7 446]

According to Oviedo Bustos *Isospora hominis* and *Isospora bigeminum* are the two genera of coccidia which are parasitic for human subjects. *Isospora bigeminum* was encountered in the two cases described by him. While the majority of cases reported in the literature originated in the Eastern Mediterranean and in Japan, China and

CAPLAN A A Critical Analysis of Collapse in Underground Workers on the Kolar Gold Field *Bull Inst Mining & Metallurgy* 1943 Nov No 463 1-70 12 figs [15 refs] [Summary appears also in *Bulletin of Hygiene*]

All cases of alleged collapse in underground workers however mild during a period of two years were seen by the author on admission to hospital usually one to two hours after the collapse There were 293 cases in all but in 49 of them there had been no collapse or it was not related to underground conditions These 49 cases are analysed The remaining 244 cases were assessed as due wholly or partly to underground conditions and they comprise 194 cases in which the collapse was classed as mild 41 classed as moderate and 9 in which there was severe collapse

The mild cases had almost completely recovered when admitted to hospital They gave histories of fatigue asthenia giddiness nausea and less frequently vomiting cramp and loss of consciousness Loss of consciousness was often momentary and was probably never of more than 10 minutes duration Abnormal physical signs noted were hypotension (systolic blood pressure 90 to 105 mm Hg) in 37 per cent of cases reduced pulse pressure (5 to 15 mm Hg) in 26 per cent of cases bradycardia (pulse rate 40 to 60) in 21 per cent low plasma chloride concentration (under 560 mgm per cent) in 67.7 per cent of 170 blood examinations and mild dehydration as indicated by some loss of skin elasticity in 9 per cent of cases

The moderate and severe cases gave a clinical picture resembling surgical shock The arbitrary criteria for classification as severe were complete unconsciousness and inability to palpate the pulse at the wrist In both these groups of cases the prodromal symptoms of fatigue asthenia giddiness and nausea were always followed by vomiting cramp and unconsciousness with visual and aural disturbances in roughly half the cases Vomiting often recurred five or six times and the vomiting was followed within a few minutes by cramp of varying degrees of severity—usually confined to the extremities but sometimes affecting the abdomen and trunk The skin was cold and clammy the temperature as low as 90 to 96 F the pulse weak or absent and the heart rate 80 to 140 beats per minute In severe cases the blood pressure was indeterminate and in the moderate cases it was commonly 60 to 90 mm Hg and always below 90 mm Pulse pressures were 2 to 10 mm Haemoglobin estimations as high as 140 per cent and red blood counts up to 7½ million per cmm were found and increased viscosity of the blood was noticeable when venepuncture was attempted Plasma chloride was abnormally low (below 560 mgm per cent) in 86.1 per cent of 43 examinations Blood urea and blood sugar concentrations were within the normal range

Those less severely affected were kept in bed for 12 to 36 hours and were put on a fluid diet (milk coffee salt water glucose) for 12 to 24 hours From 4 to 5 pints of fluid were given during the first 24 hours The moderate and severe cases were treated on the general principles for shock warmth fluids stimulants and morphia when necessary Salt water (1 teaspoonful NaCl to 1 pint of water) milk with coffee and glucose were given orally to all conscious patients at frequent intervals—5 to 7 pints of fluid being given in the first 24 hours When the systolic blood pressure was below 80 mm Hg or when vomiting occurred in hospital oral fluids were supplemented by 2 to 4 pints of normal

saline given rectally by continuous drip. Saline was given intravenously to comatose and pulseless patients or in moderate cases when vomiting was persistent. 20 ounces were run in rapidly and 1 to 3 pints more were given by continuous drip. After the first 24 hours the daily fluid intake was reduced to 3 or 4 pints and most patients took full diet 48 hours after admission.

There were no deaths in these series. The patients recovered rapidly. In cases where the pulse was imperceptible on admission intravenous therapy evoked dramatic response within 10 minutes the blood pressure was measurable and in 15 minutes rose to about 90 mm systolic and 70 mm diastolic. Clinical signs of dehydration usually disappeared within 24 hours and haemoconcentration as measured by haemoglobin estimations and red blood counts disappeared *pari passu* with the loss of signs of dehydration. In cases where the initial plasma chloride was abnormally low 94 per cent showed an increased concentration two to three days after collapse. Most mild cases were discharged after two days in hospital while the moderate and severe cases were kept in bed for at least three days and discharged after four to seven days.

The relation of chloride deficiency to collapse is discussed. Plasma chloride concentrations below 560 mgm per cent are taken as abnormally low. (It may be noted that TALBOTT *et al* (*Bulletin of Hygiene* 1934, 9, 23) found in seven subjects an average chloride concentration of 106.4 mEq per litre of serum which is equivalent to 627 mgm NaCl per 100 cc. The lowest concentration recorded for any of these seven subjects was 104.8 mEq of chloride per litre or 613 mgm NaCl per 100 cc of serum.) Low plasma chloride concentrations (below 560 mgm per cent) were found more frequently in moderate and severe cases than in mild cases. Among the mild cases low chloride concentrations appeared more frequently when there was vomiting than when there was not and more frequently in patients with cramp than in those without cramp. It is remarked that cramp is usually associated with a plasma chloride concentration below 560 mgm per cent. [The reviewer has examined the detailed data given by Dr Caplan and finds that not all the conclusions have a satisfactory statistical basis. In non-collapse cases quoted in the paper the proportion of low chloride concentrations (less than 560 mgm) is significantly smaller than in the mild cases and the proportion of low concentrations is significantly smaller in the mild cases than in the moderate and severe group. Within the group of high and low chloride concentrations in the two groups cramp and no cramp do not differ significantly and similarly there is no significant difference between the group of cases in which vomiting occurred and that in which there was no vomiting.]

Work in the Kolar gold mines is carried on at great depths levels 8,000 ft below the surface as mentioned. At these depths temperatures are high. Many men work at dry bulb temperatures of 100 to about 120°F and the wet bulb temperature is frequently between 90 and 97°F. At the deeper (and hotter) levels seasonal variations in dry bulb temperature are small but there are substantial changes in the wet bulb temperature and the water vapour content of the air consequent on changes of humidity at the surface. There appears to be some correlation between humidity at the surface and the incidence of cases of collapse but it is difficult to assess the significance

of this Cases of collapse occurred most frequently at depths of more than 5 000 ft in dead ends supplied with upcast air of low velocity but no information is given (and probably could not be obtained) of the collapse rates at different dry bulb or wet bulb temperatures

Of the personal factors related to collapse the more important in order of frequency were loss of acclimatization disturbance of health and lack of acclimatization Collapse occurred in many individuals who had been absent from work for two to seven days but whether this absence was long enough to cause loss of acclimatization is uncertain It is noteworthy that many hundreds of thousands of man shifts have been worked in atmospheres with wet bulb temperatures of 90 to 97 F without collapse occurring Probably when a labourer finds a place too hot he refuses to work

At the high temperatures prevailing in the Kolar gold mines the author suggests that the wet bulb temperature is a good index of comfort—high wet bulb readings are always associated with poor ventilation

Collapse is liable to occur when the underground wet bulb temperature exceeds 90 F and especially when it is above 93 F Hence the engineering problem is to keep the wet bulb temperature from rising above 93 F [The reviewer would prefer to see 90 F as the upper limit] Improved ventilation can do much but at depths of 7 000 to 8 000 feet air cooling is necessary The value of refrigeration is shown by a dramatic fall in the incidence of collapse after the installation of air conditioning plant at the Champion Reef Mine

[This is an important paper which deserves careful study]

T Bedford

BROWN H R JR CLARK W F JONES N WALTHER Johanna & WARREN S L The Relationship of Dehydration and Overhydration of the Blood Plasma to Collapse in the Management of Artificial Fever Therapy *J Clin Investigation* 1943 July 22 No 4 471-85 11 figs [37 refs]

In 1100 hyperpyrexial treatments between 1930 and 1937 the authors encountered many cases of collapse with a mortality rate of 10 per cent of their total cases They found that these serious collapse cases were very often related to the water and salt intake and the state of hydration of the patients The exact relationship between collapse and the water balance is not simple serious signs are found associated usually with dehydration but occasionally with overhydration of the blood plasma The plasma specific gravity is used to differentiate those groups—a specific gravity over 1 0290 is taken to indicate dehydration below 1 0255 as over hydration

The clinical picture of collapse is on the whole very similar in both groups Accompanying the hyperpyrexia the pulse is rapid the systolic pressure falls the respiration is shallow pallor or cyanosis is present and the extremities are cold in spite of the high temperature Mania and later unconsciousness may supervene Sweating and urinary excretion often cease

The authors explain how the extreme dehydration or the waterlogging is produced but the origin of the very similar clinical picture from those contrasted conditions is not clear Overhydration is caused by an excessive fluid intake combined with the cessation of sweating and urinary excretion The dehydration is produced by an inadequate

fluid intake in the presence of excessive and long continued sweating.

By following the plasma specific gravity the authors are able to forestall the development of collapse and hence to control the water and salt intake. By this means they have greatly reduced the incidence of collapse during artificial fever therapy.

J. S. Weiner

BOOK REVIEWS

ROCKEFELLER FOUNDATION INTERNATIONAL HEALTH DIVISION
Annual Report 194° pp 18+194 With 11 figs on 6 plates
New York 49 West 49th Street

This report of the activities of the International Health Division is as usual very readable and serves to show the wide range of interest maintained by the Division. Many of the papers quoted have been summarized in this *Bulletin* or in the *Bulletin of Hygiene* and the results of the work reported will be familiar to readers but there are references to as yet unpublished work.

The subjects dealt with include yellow fever investigations in America and Africa, studies on influenza and other respiratory diseases including atypical pneumonia, typhus, rabies, nutritional problems, malaria, tuberculosis and other disease. There are sections on aid given by the Foundation to State and local health services and on public health education. There is a table of expenditure.

The report is an excellent résumé of the work done, written in attractive style and with discriminating selection of essentials. It is evident that the Foundation is prepared to support research and investigation into the unexpected ramifications of any subject which engages its attention and it is clear that such minute and assured research is usually well worth while. That the Foundation is prepared to finance large public health schemes is illustrated by its record in the elimination of *Anopheles gambiae* from Brazil; that campaign is now successfully over but unceasing care must be taken to ensure that it does not become necessary again. In the present report work on the biology of *A. gambiae* done during the campaign is referred to.

The high standard of the work of the staff of the Foundation is maintained and this report like its predecessors enables a reader to estimate the great scope of a great organization. Charles Wilcocks

AUSTRALIA COMMONWEALTH OF DEPT OF HEALTH SERVICE
PUBLICATION (SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE) No 3 Dengue Part I Medical [JUMLEY George F M B Ch M D T M (Sydney)] Part II Entomological [TAYLOR Frank H F R E S F Z S] 171 pp With numerous figs & maps 1943 Apr 9 Glebe New South Wales Australasian Medical Publishing Company Ltd

This little book may not become a best seller among the lay public of Australia for whom it was ostensibly written but it certainly deserves a hearty welcome from the large section of the medical profession who are interested in dengue.

Part I (Medical) consists of 133 pages and has a bibliography with 140 references to publications. Each aspect of the disease is dealt with in turn; the findings and opinions of various observers are stated and then summed up by the author in an impartial and judicious manner.

Every important contribution in English has been taken into account and as nearly all the research on the disease has been carried out by American and Australian workers the whole field is well covered. Full justice is done to the clinical and other observations by British and foreign medical men.

The striking degree of variability of the disease is clearly shown and if the book is as widely read as it deserves to be there will be fewer reports in future years of the discovery of new short fevers which really are variants of dengue.

The section on the transmission of the disease to experimental animals is of special interest. The author agrees with SIMMONS that monkeys are to some degree susceptible and that many of the reported failures of attempts to reproduce the disease in these animals have been due to the use of monkeys which had lived in endemic areas where they were likely to have acquired immunity by previous attacks. In view of the possible existence of animal reservoirs of infection the term 'jungle dengue' is provisionally suggested as referring to dengue in animals but not necessarily as a parallel to the term 'jungle yellow fever'.

Part II (Entomological) consisting of 29 pages contains a clear and well illustrated description of the chief vectors *Aedes aegypti* and *Aedes albopictus*.

The paper cover is quite unworthy of the contents; the title cannot be seen when the book is standing on a shelf and there is no Index, but it is to be hoped that these drawbacks will not deprive the work of the wide publicity it deserves.

John W D Meade

MARTINDALE *The Extra Pharmacopoeia* Twenty Second Edition in Two Volumes Vol 2 pp xxxiii+1217 1943 London The Pharmaceutical Press 17 Bloomsbury Square WC1 [27s 6d] [Review appears also in *Bulletin of Hygiene*]

This second volume of the 22nd edition of *The Extra Pharmacopoeia* contains 70 more pages than the second volume of the 21st edition published in 1938. Its general scope has undergone little change but the Editor and the Revision Committee have evidently exercised great care and judgment in the selection of new matter for notice and in the revision of earlier matter in the light of progress of research in medicine and chemistry to ensure that the volume contains accurate information likely to be of most value to its users.

The principal section comprising Analytical Addenda to Chemicals and *Materia Medica* in Volume I has been brought up to date by the incorporation of alterations and amendments from the Addenda to the British Pharmacopoeia and the Supplements to the British Pharmaceutical Code issued since 1938 as well as of information from the Pharmacopoeia of the United States 1942 and other recently published national formularies and pharmacopoeias.

The section on Proprietary Medicines is prefaced by a brief historical review of efforts to secure adequate legislative control over the advertising and distribution of patent medicines and gives a resume of the essential provisions of the Pharmacy and Medicines Act 1941 as they affect the sales of these preparations. The list of formulae which follows gives information on some 750 of them.

In revising the article on Chemotherapy to include the work of the last few years the account of the development of the sulphonamide

drugs has been brought up to date by the inclusion of the main compounds of this type in use today and by the suggestion of possible future lines of research in this series.

The application of electro-oxidation and electro-reduction to analytical problems by means of current voltage studies has led to the inclusion of a new section on Polarographic Analysis—a method that has been applied recently by GOODWIN and PACE to the study of organic antimonials in relation to their leishmanicidal properties [this *Bulletin* 1944 v. 41: 20].

The principles apparatus and technique used in the application of spectrophotometry to analytical work are also the subject of a new section.

Some aspects of the problem of food in wartime are reviewed in the revised section on Nutrition to which a table giving the composition and caloric values of a large number of foods has been added. A general account of the composition and control of wartime food substitutes is also included.

The section of some 120 pages dealing with Bacteriological and Clinical Notes with Reference to Special Diseases has been amplified particularly for certain bacterial and parasitic diseases likely to have an increased prevalence among men returning from service overseas. In the account of Leprosy in this section some reports claiming encouraging results from treatment with diphtheria antitoxin or toxoid are mentioned. More recent reports however of carefully controlled trials have led regretfully to the view that there is no pathological or clinical basis to support the diphtheria toxoid treatment for leprosy [see this *Bulletin* 1944 v. 41: 51-2].

The short section on Disinfectants has been completely rewritten and contains accounts of wartime experience in the use of antiseptics in wounds and of colloidal mists or aerosols for the sterilization of atmospheres in air raid shelters and other crowded places.

These few notes are only an indication of the thoroughness of the revision. The whole volume provides evidence of the close and sustained labours which must have gone to its preparation under conditions prevailing during a world war.

P. L. Sheppard

MARTINDALE. Supplement to the Extra Pharmacopoeia. Twenty Second Edition. Vol. 1. 48 pp. 1943. London: The Pharmaceutical Press, 17 Bloomsbury Square, W.C.1. [2s.] [Review appears also in *Bulletin of Hygiene*.]

The first volume of the 22nd edition of the Extra Pharmacopoeia was published in May 1941 since when many changes have been made in the British Pharmacopoeia, the British Pharmaceutical Code, and the United States Pharmacopoeia and National Formulary. The principal changes, chiefly arising from war conditions and the consequent scarcity and control of ingredients, are set out in summary form in tables now issued as a Supplement to the Extra Pharmacopoeia, volume 1. The supplement also gives a résumé of recent Statutory Orders affecting supplies of drugs, etc., and lists of some new proprietary names and of additional approved names for substances formerly known by other names.

R. L. Sheppard

TROPICAL DISEASES BULLETIN

Vol 41]

1944

[No 4

SUMMARY OF RECENT ABSTRACTS *

III MALARIA

[Continued from p 167]

Treatment

Combined drugs—COVELL (p 750) points out that the Fourth General Report of the Malaria Commission of the Health Organisation of the League of Nations advocated short courses of treatment with moderate dosage for primary attacks and relapses of malaria. These are usually sufficient and are said not to interfere unduly with the acquisition of immunity, whereas prolonged administration of drugs when the disease is latent does no good and may be harmful.

Military operations are taking place to an increasing extent in countries in which malaria is endemic and the loss of the quinine supplies of Java has made it necessary to revise standards of treatment. WEED (p 361) gives details of courses of treatment advocated by the National Research Council of the United States. He gives the revised composition of totaquine of which more use is to be made. The combined QAP treatment is the method of choice and comprises quinine (or totaquine) for 2-3 days, atabrin for 5 days and after a 2 day pause plasmoquine for 5 days. Alternatives are given. For suppressive treatment atabrin is given on 2 days (not consecutive) each week.

BARBER (p 822) has used the following treatment for men of the United States Navy in a heavily infected area.—Quinine 45 grains daily for 3 days, then 30 grains daily for 7 days, on the last 2 of which some atabrin was also taken, then atabrin 0.3 gm daily for 5 days, finally quinine 15 grains daily for 2 weeks. After this the patients reverted to prophylactic doses of atabrin.

The following combined treatment is advocated by the Medical Department Tanganyika Territory (p 879) as probably the most effective in *P. falciparum* infections.—quinine 20-30 grains daily for 2-3 days, then mepacrine 0.2-0.3 gm daily for 5 days, then after a pause of 5 days the mepacrine course may be repeated. Mepacrine alone or

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 v 40. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

quinine alone may be used but in all cases short courses are recommended. Injections may be called for in severe attacks.

WINGFIELD (p 218) gives vigorous treatment to patients seen in England. Most of these are seamen suffering from *P. falciparum* infections contracted in West Africa. He gives mepacrine 0.3 gr and quinine 10 grains daily for a week, then quinine 10 grains daily for a week, then for a week the first week's treatment is repeated. If crescents are then found pamaquin is used. He has found intramuscular quinine dramatically successful in seriously ill patients. All patients received adequate doses of iron. He (p 271) has also used with success the following treatment for *P. falciparum* infections: Two intramuscular injections of solochin daily for 4 days, then mepacrine 0.3 gm daily for 7 days, then after a short interval pamaquin 0.03 gm daily for 3 days.

Quinine—HAMILTON (p 700) writing from experience in the Netherlands East Indies expresses marked preference for quinine over the synthetic drugs. The treatment he advocates: 15 grains of quinine daily for a week for prophylaxis [suppressive treatment]; he gives 10 grains of quinine on each of two successive days each week.

BOYD (p 701) makes the point that artificially induced *P. vivax* infections are usually eradicated by quite small doses of quinine but that this does not apply to artificially induced *P. falciparum* infections.

In *Science* (p 790) there is a note on the new standards for totaquine which have been adopted in the United States—these will render the treatment more uniform and will allow fuller use of South American barks. At a recent conference on tropical disease the general opinion was expressed that totaquine is equal to quinine in the treatment of malaria.

TOMMASO (p 880) reports from Ethiopia five cases of *P. falciparum* malaria (in one of which *P. vivax* was also found) which showed unusual resistance to quinine.

PELMER and SASKIN (p 290) report a case of toxic amaurosis which developed after a few moderate doses of quinine and which cleared up dramatically after intravenous administration of sodium nitrite leaving some residual contraction in the visual fields.

GLAZKO (p 880) describes a method of detecting quinine in urine by the use of a reagent which contains HgI_2 . [In the abstract it is stated that to 5 cc of urine 5 cc of the reagent are added. This is incorrect—it should read—to 5 cc of urine 5 drops of the reagent are added.] BRODIE and UDENFRIEND (p 871) have devised a simple method of estimating quinine in human plasma.

Mepacrine—MURRAY and SHUTE (p 821) insist that mepacrine is at least the equal of quinine in the treatment of *P. falciparum* malaria and that 0.6 gm is equivalent to 15–20 grains of quinine.

THOMPSON (p 821) writing of West Africa states that the routine treatment consists of mepacrine 0.6 gm on the first day followed by daily doses of 0.3 gm.

SILPHASON (p 871) in the Sudan uses somewhat heavy doses of mepacrine—first day 0.6 gm, second and third days 0.4 gm daily, fourth to sixth days (inclusive) 0.3 gm daily. No toxic effects were seen, pyrexia was rapidly controlled and there is evidence that relapses were less common than with the lower doses usually recommended.

HAWKING (p 823) has shown that when mepacrine methanesulphonate (atebrin musonate) is injected intramuscularly there is always

some necrosis of muscle though considerably less extensive than that caused by quinine

DEARBORN *et al* (p 823) have studied the accumulation and excretion of mepacrine in dogs the paper cannot further be abstracted

HUENE (p 292) gives a list of changes which he claims are brought about in *P falciparum* as a result of treatment with atebirin

In the *Journal of the American Medical Association* (p 582) is a note to the effect that the occurrence of mental symptoms after the use of atebirin is slight and that the Surgeon General of the United States Army has ruled that quinine prophylaxis is to be used only if a man cannot tolerate atebirin

AYALA and BRAVO (p 751) discuss the psychoses which may follow the use of atepo (which contains atebirin and plasmoquine) such mental conditions are however rare

Gametocides—For the treatment of benign tertian malaria as it is seen in Croatia GEORGEVIC (p 291) advocates atebirin in daily doses of 0.4 gm. If atebirin is not available he gives quinine along with salvarsan. Quino plasmoquine is always given as an after treatment. With the atebirin treatment relapses occur in 8 per cent with the quinine salvarsan treatment in 25 per cent of cases. This author (p 291) discusses larval (masked) malaria. The diagnosis is exceedingly difficult being made largely by exclusion and the only drug which is effective is said to be plasmoquine in association with quinine. This form is said to be seen in Croatia in winter in spring it is apt to break out into an acute attack.

DREŃOWSKI (p 669) writes of satisfactory results obtained by the treatment of ambulant malarial patients with quinoplasmoquine in courses of 10 to 20 days in doses equivalent to 3 or 4 tablets daily for an adult.

AGUILAR MEZA *et al* (p 292) give an account of methods of treatment and control employed in Guatemala where infection with *P falciparum* is common. Certuna has been used as a gametocide and is apparently rather more effective than plasmoquine.

RAFFAELE and SANDICCHI (p 218) describe the action of the Italian preparation Gamefar which appears to be almost if not quite identical with plasmoquine.

Other drugs—WHELEN and SHUTE (p 752) write of the use of thio bismol in therapeutic *P vivax* malaria. Given about the fourth day after the onset of the febrile attack this drug produces a remission of 48 hours which is followed by a regular tertian fever. YOUNG *et al* (p 881) have used thio bismol in induced *P vivax* infections. It appears to act on half grown parasites only and is capable of converting quotidian to tertian fever. For termination of *P vivax* infections an injection of thio bismol the day quinine is started subdues the fever more promptly than quinine alone. Thio bismol appears to have no action in *P falciparum* infections.

In *Folia Medica* (p 824) is a note on iodo-mercurate of manganese in combination with extract of spleen which in Brazil is claimed to be satisfactory in the treatment of chronic malaria and in prophylaxis. [It will be remembered that adverse reports of this preparation have been given in India and Malaya.]

VIDELA (p 13) advocates intravenous injection of 10 cc of a 10 per cent solution of calcium chloride on alternate days to a total of 5 injections in the treatment of chronic splenomegaly due to benign

tertian malaria after the temperature has been controlled by quinine. He claims that this treatment is successful in reducing the splenic enlargement.

MOHR (p. 13) states that there is increased metabolism of vitamin C in malaria and that this vitamin is important as an adjuvant to iron in the treatment of the anaemia which follows malaria.

Suppressive Treatment

For drug prophylaxis [suppressive treatment] BARBER (p. 822) advocates atabrin in the following doses—0.05 gm daily for 6 days each week, 0.1 gm being taken on the 7th day. The total is therefore 0.4 gm each week. [The part of the world is not stated but infection is said to have been heavy.]

CODA (p. 218) uses a form of treatment in which after the clinical attack is brought under control the patient receives atabrin 0.3 gm and plasmoquine 0.02 gm once each week or twice each month. This suppressive treatment is claimed to prevent relapses and yet to allow the development of the state of premunition.

FAIN and BENTZ (p. 218) record 2 cases of haemoglobinuria in young African children in the Belgian Congo after the administration of prophylactic quinine. Four other children had somewhat similar attacks. The children were not affected at the same time and other untoward effects of quinine prophylaxis have not been recorded. *P. falciparum* malaria is hyperendemic in the area.

Control

RUSSELL (p. 882) discusses military malaria control. He refers to all the standard measures which should be applied in military as in civil communities when conditions allow but discusses at length the spray killing of adult mosquitoes and describes the Freon Pyrethrum Aerosol much used by the United States Forces. He points out that many anti-malaria measures require the intelligent cooperation of the individual soldier. This aerosol (the Freon bomb) is described in the American periodical Soap (p. 887). It contains Pyrethrum concentrate dissolved in dichlorodifluoromethane and the cloud from one bomb will kill all flies and mosquitoes in 100 000 cubic feet. It appears to be safe and the mixture is non-inflammable.

RUSSELL *et al* (p. 14) have successfully used a kerosene extract of Pyrethrum flowers diluted with 3 or 7 times its volume of water in the presence of an emulsifying agent for spray killing adult mosquitoes. The stronger emulsion was rather more effective than the weaker but the results with each were very good and the total cost was much less than that of the Pyrocyde spray generally used in India. KUNDE and SIVAPATHY (p. 116) have described the various types of apparatus used for the spray killing of adult mosquitoes.

BOLTEV (p. 7-3) shows that malaria is a serious problem in the military forces stationed in Porto Rico where *P. falciparum* is the common parasite and *A. albimaris* the important vector. Although antilarval measures have been instituted the chief protection so far has been due to mosquito-proofing of barracks and spray killing of adult mosquitoes in the protected quarters.

POGODINA and SOKOLOV (p. 15) report that alkaloidal mists derived from anabasine sulphate or anabasine base by evaporation are effective

in killing mosquitoes. Unpleasant odours are produced but rapidly clear from buildings and the mists are apparently harmless to rabbits and fowls and to foodstuffs.

МАРИОВИЧ (p 519) states that in N Russia the practice of spraying houses and cowsheds in summer with a 3 per cent solution of soft soap (more effective if raw alcohol is added to the extent of 2 per cent) causes considerable reduction in the numbers of *A. maculipennis*. PRENDEL (p 521) states that insecticidal sprays containing $\frac{1}{4}$ per cent soft soap and 1 per cent formalin or $\frac{1}{2}$ per cent hard soap and 2 per cent crude alcohol are very effective against *A. maculipennis* and other mosquitoes in Odessa but produce too great humidity for use in human habitations. Sprays of Pyrethrum steeped in benzene or of soft soap with 0.1 per cent anabasin sulphate were very effective and insecticides of Pyrethrum dust with wood ash or a dust of 15 per cent anabasin sulphate were equally useful.

SHLENOVA (p 520) points out that if control (by dusting) of larvae of *A. maculipennis* in the Moscow province is discontinued before the middle of September there is considerable increase in the number of overwintering females. Adults should be systematically destroyed in cowsheds in spring if this is done the subsequent collections of larvae are greatly reduced. He gives information on the habits of this mosquito.

COVELL (p 752) has contributed a paper on the *desiderata* of anti-malaria organization in India. No adequate summary can be given but the original should be consulted by those interested in the subject. He is an advocate of extensive spray killing of adult mosquitoes with preparations of Pyrethrum.

RUSSELL *et al* (p 753) point out that malaria may retard agricultural development but that although irrigation schemes may introduce or increase malaria in general the more extensive and intensive the agricultural practice the less intense and extensive may malaria become. They describe the control measures taken in the Pattukkottai taluk and note that spray killing is an effective procedure which can be carried out for an overall cost of one quarter of one rupee per head per year.

KNIPE and RUSSELL (p 673) give an account of the antilarval control measures which have been employed in the Pattukkottai taluk South India in recent years. *A. culicifacies* is the vector and breeds extensively as a result of an irrigation scheme inaugurated in 1933. The methods included filling and draining control of channels, the use of Gambusia and Paris green and intermittent irrigation. An additional aim was to raise the standard of living by securing better agriculture and improving other facilities. The results estimated by spleen and parasite rates compared with those of a control area have been very good. The total cost for 4 years was 6s. 6d. per head of population but the maintenance cost after engineering work was completed was 2½d. per head for 1 year. RUSSELL *et al* (p 114) have investigated the possibility of controlling the breeding of this mosquito in rice fields by introducing the process of intermittent irrigation and have found that a cycle of 5 wet days followed by 2-4 dry days is satisfactory for this purpose except during the rainy season when the ground cannot be dried. *A. culicifacies* however does not breed actively in rice fields during the rains nor does it do so when the plants have reached a height of a foot. Intermittent irrigation of this extent does not affect the yield of grain or straw. To carry it out effectively supervision of the ryots would be necessary.

RAO (p 113) in India has continued his experiments on the control of anophelines by stocking rice fields with sullage at weekly intervals from February to May. Rice is broadcast in June when the monsoon sets in. Not more than one inch of sullage is allowed to flow in and this is completely absorbed within 4 days. It was found that although the larval population of non-vector species was increased that of vectors such as *A. annularis* and *A. aconitus* was substantially reduced. Moreover the yield of rice was improved.

RAO (R. B.) and RAMOO (p 115) have observed that in the Patruk Kotai taluk the breeding of *A. culicifacies* is more intense in canal whose banks are free from shrubs than in those with dense marginal growth. These plants provide shade and mechanical obstruction to ovipositing females. It will be remembered that *A. culicifacies* hovers some inches above the water surface during the process of oviposition. Two creepers are named which offer good prospects of reducing breeding if planted along canal banks.

THOMSON (p 436) points out that when *A. minimus* is controlled by shade or by clean breeding essentially the same thing is happening. Shade does not repel the female but it kills the grass and so destroys the sheltered niches in which eggs could have been laid. Shading and removal of weeds operate in stream by increasing the rate of flow of the water.

SHANNON (p 507) has written a brief account of the successful campaign against *A. gambiae* in Brazil. The eradication of this mosquito is due to the topographical conditions which were unfavourable to it the presence of an organization capable of tackling the work the biological habits of the mosquito the use of Paris green and insecticidal sprays and the failure of *A. gambiae* to escape to the better regions. SOYER and WILSON (p 670) give a fuller account of this work and also of the eradication of *Aedes aegypti* from large areas of Brazil. For success in an eradication programme the aquatic and adult forms of the mosquito should be easily discoverable the method of destruction should be efficient the area to be worked should be sufficiently large or isolated and there should be enough money and staff to do the work thoroughly—these are usually only available if the problem is serious.

HOPKINS (p 671) has surveyed the subject of mosquito and malaria control with special reference to East Africa where *A.ambiae* and *A. funestus* are the vectors. The generally accepted antilarval method are reviewed but emphasis is laid upon various action in the control of *A. gambiae* and *A. funestus* along the shores of Lake Victoria and a small lake. Papyrus and mud banks were cut away and a shore line of firm steep banks was constructed which was exposed to the sun and acted on of the lake water. The initial cost was fairly high but upkeep has been very cheap and breeding has almost been eliminated. He (p 679) writes of the value of cotton seed tar as a by-product produced by ginneries which is a producer gas as a substitute for larvicidal oil. BLACKLOCK and WILSON (p 358) describe simple methods for preventing the breeding of *A. gambiae* in small agricultural ponds.

DAVID (p 293) has found that by combining waste lubricating oil 10-30 per cent kerosene 10-20 per cent and diesel oil 60-75 per cent a satisfactory larvicide oil with good spreading pressure film stability and toxicity can be obtained. Waste oils however vary so much that satisfactory proportions can be found only by experiment. He

(p 16) gives details of simple tests for estimating the suitability of mineral oils as mosquito larvicides these cannot usefully be abstracted

AFANASSIEV (p 521) writes of the value of a distillate from coke stills as a larvicide It kills larvae and pupae in an hour but is relatively harmless to *Gambusia*

RENN (p 582) notes that the natural film which forms on undisturbed waters and which if broken by wind collects round the leeward edges of pools may block the spread of larvicidal oils These films should be broken by agitation of the water before oiling is done

D AMATO (p 219) discusses the malaria control measures taken in the endemic malaria zone of North Argentina Distribution of quinine and the use of oil and Paris green are mentioned

HOWARD and ANDREWS (p 16) have shown that when a mixture of Paris green and lime is blown either from hand blowers or from power dusters the Paris green settles out at shorter distances than does the lime and therefore that the extent of visible dust is greater (and may be much greater) than the extent of water actually receiving Paris green It is therefore desirable to find a diluent whose density and behaviour in aerial suspension are more nearly akin than lime to those of Paris green

KNIPE and RUSSELL (p 115) have described automatic machines for the distribution of Paris green

HINMAN *et al* (p 17) have experimented with the object of finding a cheaper and more effective arsenical larvicide than Paris green Copper arsenite was found to be at least as effective as Paris green it had a uniformly fine particle size and the authors consider that particles of average size of 5-15 microns are more effective than those of 25 microns MESSERLIN (p 753) also states that calcium arsenite gives results equal to those given by Paris green it is used in the same way but with powdered marble as the diluent

ROBERTSON *et al* (p 15) have contributed a paper on ditch linings which cannot further be abstracted ANDREWS *et al* (p 673) and LEGWEN and LENERT (p 673) have also published papers on the technical aspects of ditch lining in malaria control LEGWEN and HOWARD (p 674) describe a new automatic siphon

SHAIKIN (p 437) has studied the biology of *Gambusia affinis holbrooki* and *Leucaspis delmeatus* each of which may be used in the Ukraine for the control of mosquito larvae RAO (R B) and RAMOO (p 114) describe their experiences with larva eating fish in the wells of Pattukottai The fish have many enemies and their use is not simple

Malaria of Monkeys and Birds

RODHAIN (p 438) discusses the malaria parasites of apes *P reichenowi* is not regarded as identical with *P falciparum* and the evidence though conflicting suggests that *P schweileri* is not identical with *P vivax* *P rodhaini* however is probably identical with *P malariae* and recent experiments which he describes have tended to confirm this view

RODHAIN and LASSMAN (p 119) have found that the cycle of development of *P schweileri* of the chimpanzee (which closely resembles and has in fact been claimed to be *P vivax*) lasts 48 hours An experiment indicated however that the parasite was not easily transmitted by *A maculipennis* var *atroparvus* and that such oocysts as were found were larger than those of *P vivax*

WENDEL (p 674) has studied the respiratory and carbohydrate metabolism of *P. knowlesi*. Oxygen is consumed and glucose destroyed by infected red cells *in vitro* with great rapidity and about half the destroyed glucose is converted into lactic acid. Anaerobiosis stimulates glycolysis by the infected cells. Addition of glucose to the blood leads to a rapid fall of pH and a decline in oxygen consumption and glycolysis but both metabolic processes cease at pH 5.5. Sulphanilamide is one of the substances which usually have no significant influence on the respiration or glycolysis of parasitized cells.

NIJOGI and ROY (p 700) have cultivated *P. knowlesi* by a modified Basal and Johns method. Cultures kept at 24°C were infective for 4 days those kept at 37°C for 2 days only.

For the complement fixation reaction RAY *et al* (p 118) advocate treating blood (infected with *P. knowlesi*) with a haemolysin prepared against the red cells. This removes all traces of the cells from the parasites which can then be washed and centrifuged. Other methods of preparing antisera are also discussed.

FULTON and YORKER (p 704) succeeded in rendering a strain of *P. knowlesi* resistant to plasmoquine during passage through 8 monkeys. They then maintained this strain for 5½ months in another monkey and found that it was still considerably resistant to plasmoquine. This resistance therefore has some degree of stability.

RIGDON and STRATMAN THOMAS (p 118) have studied the pathology of *P. knowlesi* infection of monkeys. Certain changes are similar to those which occur in human beings dying of severe anaemia: dilatation of the heart, oedema of the lungs, necrosis of central hepatic cells, parenchymatous degeneration of the kidneys. The authors suggest that the severity of the anaemia (with consequent anoxaemia), the intensity of the infection and the rapidity with which the disease progresses are responsible for these effects.

NIJOGI (p 70) notes that injection of a suspension of *P. knowlesi* in phenol saline into monkeys suffering from chronic homologous infection will reduce the number of parasites in the blood. This effect is not seen in acute infections.

TRAGER (pp 676-825) reports observations which showed that ducks infected with *P. lophurae* when they were in a condition of biotin deficiency experienced more severe malaria than controls and that biotin deficiency induced markedly increased susceptibility to *P. cathemerium* infections. Administration of biotin to deficient birds lessened the severity of *P. lophurae* infection but did not influence those in normal birds. Biotin in the plasma is raised during the infection and it appears that biotin is mobilized in the blood from the tissues and may show activity by reducing the number of parasites. The fact that plasma biotin in chickens infected with *P. lophurae* rises more rapidly and to a greater height than in ducks may provide the explanation of the fact that chickens at a certain age get rid of their infections more quickly. It may be that biotin is an essential growth factor for the parasites with a certain optimal range of concentration but more work must be done before this can certainly be claimed. The author states that marked deficiency of pantothenate had no comparable effect.

HERWITT (p 22) has made a detailed study of the host-parasite relationships of untreated infections with *P. lophurae* in ducks. The mass of information cannot be given in an abstract but the work is most valuable as a basis for the study of malaria parasites and of the

effects of drugs. It has not hitherto been possible to demonstrate exoerythrocytic forms of *P. lophurae* which is an advantage in certain chemotherapeutic experiments.

As a result of a very large number of observations on giant white Peking ducks infected with *P. lophurae* HEWITT *et al* (p 439) have found that for the qualitative testing of anti malarial drugs standard conditions of infection can be obtained by using ducks 2 weeks old inoculated with 2 billion [2 000 million] parasites per kgm body weight the parasites having been taken from a duck on the 4th or 5th day after infection. The peak of infection is reached on the 4th to 7th day. For quantitative tests ducks 6 weeks old which produce the most uniform infections are preferable. MARSHALL *et al* (p 223) have been able so to standardize infection of ducks with *P. lophurae* that they have effectively compared the therapeutic activity of a number of sulphonamides with that of quinine. Means were devised by which the blood concentration of the drugs was kept fairly constant the drugs were incorporated in food which was taken every three hours. On the sixth day in controls 85 per cent of red cells are infected when quinine is given the figure is less than 1 and the sulphonamides gave figures varying from 2 to 5 or more. This paper should be studied by all persons working on similar problems.

In tests on ducks infected with *P. lophurae* SEELER *et al* (p 879) found that quinine, quinidine, cinchonine and cinchonidine were about equally active and that two samples of totaquine differing widely in quinine content were as active as quinine alone.

SEELER *et al* (p 756) have shown that sulphamethyldiazine given to ducks infected with *P. lophurae* at the time of inoculation and for 10 days after produced a mild infection compared with that experienced by controls and that *p*-aminobenzoic acid is capable of neutralizing the action completely.

MARSHALL (p 223) has prepared a review of the literature of chemotherapy in avian malaria which should be studied by all those who contemplate work of the same kind.

HURLBUT and HEWITT (p 583) have successfully transmitted *P. lophurae* by *A. quadrimaculatus*.

FRAGER (p 675) has studied the survival of *P. lophurae* *in vitro*. Blood from infected ducks was maintained in a medium to which various growth factors were added. The parasite was maintained alive for about 2 weeks.

MUDROW (p 116) has observed the stages of development of *P. gallinaceum* after injection of sporozoites. Rounded uninucleate extracellular forms are found after 24 hours at the site of injection. Binucleate forms are seen after 48 hours, some within mononuclear cells, at 96 hours multinucleate forms and groups of 16 merozoites are present but up to this time no parasites could be found in red cells. Drugs were tested for their effects on the endothelial stages. plasmoquine alone was useful in reducing death rates and the number of endothelial forms.

DEVINE and FULTON (p 440) have examined the pigment produced by *P. gallinaceum*. spectroscopic and chemical investigations showed it to be haematin. The pigment produced by *P. knowlesi* is also haematin.

RUSSELL *et al* (p 117) have found that in fowls inoculated with an antigen derived from the ground up thoraces of mosquitoes infected with *P. gallinaceum* agglutinins active against homologous sporozoites

are formed and may reach a titre of $1/32\ 000$. Such fowl show some resistance to infection by mosquito bite but none against injected trophozoites. RUSSELL and MORAN (p 362) have produced immunity in fowls by repeatedly injecting inactivated sporozoites of *P. gallinaceum* or serum from normal sheep or chronically infected fowl. The best results were obtained by injecting emulsions of dried thoraces of infected mosquitoes along with serum. Injection of normal sheep serum or that of chronically infected fowls greatly increases the size of the spleen. It is suggested that in the process of immunity both cellular and humoral agencies are concerned.

MEYON *et al* (p 220) report on the results of a number of experiments on *P. gallinaceum*. Many points are briefly touched upon and the reports cannot further be abstracted.

CORRADETTI (p 117) reiterates his argument that exoerythrocytic schizonts are not derived exclusively from sporozoites but may develop from inoculated erythrocytic forms. He regards them not as stages of a separate cycle of development but as representing biological characters of the species in which they occur. They are found in several species of bird malaria parasite and in *P. elongatum* development takes place in red cells and in blood forming cells but not in histiocytes. It is unjustifiable to assume that exoerythrocytic forms of human parasites exist and more so to suggest that they are responsible for relapses.

MISSIROLI (p 221) states his view that the early development of sporozoites takes place extracellularly in the lymph spaces of the tissues and not within histiocytes.

PORTER (p 241) has investigated the development of exoerythrocytic schizonts of *P. cathemerium* and *P. relictum*. In many strains these forms were not observed but in two they appeared after sporozoite infection. In the early stage they were found in liver, spleen and bone marrow; later they were abundant throughout the body in endothelium and capillaries and in collections of macrophages. He suggests two processes—one of development from sporozoites with appearance in liver, spleen and marrow; the other of development from erythrocytic schizonts whose merozoites enter endothelial cells in all organs.

BOYD and GILKERSON (p 221) have found that in canaries with latent infection with *P. cathemerium* there is a process which hinders but does not prevent multiplication of subsequently injected trophozoites.

GIVENCH and FILLMORE (p 439) have found acranil, a yellow dye to be as effective as atebriin in *P. cathemerium* infections in canaries. Its action is similar to that of atebriin but it is excreted more quickly. The effective dose is toxic to canaries but the toxicity is largely overcome by administration in a 5 per cent solution of gelatin.

HILL (p 293) considers that the immediate cause of death in pigeons infected with *P. relictum* is the anaemia due to loss of red cells.

BISHOP (p 583) has noted great variations in the number of gametocytes found in canaries infected with *P. relictum*. After the peak of infection has been passed there is a fall in the number of asexual parasites and also in gametocytes which indicates that gametocyte production is not a response to the development of immunity.

PURCHASE (p 363) describes a species of *Plasmodium* found in turkeys in Kenya.

MANWELL (p 756) has shown that strains of bird malaria parasites rapidly frozen to -65 to -78°C and kept at about these temperatures may remain viable for as long as 212 days
 Charles Wilcocks

MALARIA

WINTERBOTHAM L P & ARDEN I Two Cases of Benign Tertian Malaria in Civilians *Med J Australia* 1943 Aug 14 v 2 No 7 129-30

The two patients were boys aged 13 and 5 both residents of Brisbane the attacks were apparently typical except that after a period of feverishness [probably representing the initial continued fever characteristic of primary infections] the true rigors occurred every day without tertian periodicity. *Plasmodium vivax* was found in each case and the authors surmise that the quotidian fever was the result of multiple infection. Each boy lived within a short distance of an army hospital or convalescent depot and the brother of one of them home from Timor had suffered from malaria.

There is strong presumptive evidence that local mosquitoes conveyed the infection in both cases from convalescent soldiers. [The implication is that there is a very real danger of spread of malaria in this way during and after the war. Brisbane is very much farther south than the limits of any recorded outbreak since 1900 (see CILENTO *Tropical Diseases in Australasia* 2nd edit 1942 p 4). *Anopheles annulipes* a breeder in permanent and sunlit water and a proved carrier of *P. vivax* is found as far south as Tasmania (*ibid* p 411).] Charles Wilcocks

SHUTE P G Successful Transmission of Human Malaria with Sporozoites which have not come into Contact with the Salivary Glands of the Insect Host *J Trop Med & Hyg* 1943 Oct-Nov v 46 No 5 57-8

Various views have been held regarding the maturation of malarial sporozoites. Some observers have found that sporozoites from salivary glands are not always infective and have concluded that they become infective only after maturation in the glands. Others have held that the sporozoites in the glands are infective but those within or just escaping from oocysts are not so. In SCHAUDINN's famous experiment not yet confirmed he stated that he had observed the penetration of red blood corpuscles by sporozoites of *Plasmodium vivax* obtained from ripe oocysts on the stomach of the mosquito. In the paper under review the author states that at the Malaria Therapy Centre of Horton Hospital during the past few years 110 patients have been inoculated with sporozoites from the salivary glands of mosquitoes and 12 with sporozoites from oocysts. Of the former all became infected but of the latter only 5. To ensure that there was no admixture of gland sporozoites with those from the oocysts the following procedure was adopted. Infected mosquitoes were incubated up to the time when gland infections would be commencing. A mosquito was then dissected by first withdrawing its glands. If these were not infected the stomach was then removed. If ripe

rupturing oocysts were present the fluid on the slide was taken into a syringe and injected intravenously. It was safe to conclude that in such a case only sporozoites from oocysts had been injected. As noted above in 5 of 12 such experiments infection occurred. Amongst these were cases of *P. vivax*, *P. falciparum* and *P. ovale* infections.

C. M. Henson

ROSS E. S. & ROBERTS H. R. Mosquito Atlas, Part II. Eighteen Old World Anophelines Important to Malaria. pp II + 117 + 44 numerous illustrations. 1943 Sept 22. Philadelphia. American Entomological Society. Academy of Natural Sciences.

The general plan of the atlas has been recently explained (this Bulletin 1943 v. 40 87). It consists of drawings executed on a uniform plan of adults and larvae of selected species of mosquitoes.

The present part covers eighteen major vectors of malaria in the Old World. The reviewer hopes that illustrations of more species from both hemispheres may yet be published. The plan and execution seem excellent but there is a danger in selecting certain species and in not calling attention to others closely similar in anatomy but widely different in relation to malaria. The book is intended for use by the isolated worker in the field. Suppose he catches an Anopheles in Bengal which is very like the *A. tritaeniorhynchus* of the illustration: how can he know whether he has taken another species (perhaps of no medical importance) or a specimen exhibiting some minor variation from the normal?

The part concludes with a list of Old World species of Anopheles with important synonyms, brief remarks on geographical distribution and an indication of relation to malaria.

P. I. Buxton

OLZSCH R. Mitteilung über das Vorkommen von *Anopheles maculipennis* im Wartheau mit Angabe einer einfachen Methode der Blutfütterung von Insekten bei ihrer Haltung in Einzelhaft. The Occurrence of *A. maculipennis* in the Posen Area. A Simple Method of feeding Mosquitoes with Blood. *Zentralblatt für Bakteriologie* 1943 June 15. 150 No 4 215-17.

The paper gives the results of a survey of *Anopheles maculipennis* in the Wartheau. This is one of the Gaue of Greater Germany and connects with minor additions of the Polish province of Posen. A malaria survey has become necessary as a preliminary to settlement by Germans. Collections were made widely in the Gau and practically all the females which laid eggs were shown to belong to variety *maculipennis*.

Collections were made in winter. The female mosquitoes were brought into a warm room and fed on pig's blood diluted with half the volume of water sugar being added. They sucked this up from cotton wool moistened by the diluted blood. It is not stated what proportion would lay eggs on sugar and water alone.

P. I. Buxton

BRITISH MEDICAL JOURNAL 1943 Dec 4 718-19. Malaria Control in Freetown Harbour.

In this editorial note it is pointed out that malaria in Freetown in peacetime had been considerably reduced by the measures taken by the health authorities but that with the great use made of the

harbour during this war ships have been compelled to anchor at places usually avoided with the result that malaria has been more marked than in peace time in the crews. The subject has been and is being investigated and one result of importance which has come to light as a result of the work of Muirhead THOMSON is that it is now known that *Anopheles gambiae* var *melas* the important vector not only breeds in mangrove swamps but does so in association with one form of mangrove only. This form grows in limited clumps or orchards and can be eliminated.

Charles H Wilcocks

VAN SOMEREN G R C Notes on the Mosquitos of British Somaliland
Bull Entom Res 1943 Dec v 34 Pt 4 323-8

The paper deals with small collections made in parts of British Somaliland at several different times of year. The total number of species of mosquito known to occur is 22 among them *Anopheles gambiae* which was common though not previously recorded.

The author describes common types of breeding place and lists the localities at which the species were recorded. *Anopheles d thali* is very common in the larval stage and a previous record of *rhodesiensis* may well refer to this species. *A. turkud* was collected but not *cinereus*. *Aedes aegypti* was common and taken as high as 4 700 feet where *A. vittatus* also occurred.

P A Buxton

SINTON J A The Diagnosis of Malarial Infections *Monthly Bull Ministry of Health & Emergency Pub Health Lab Service* (directed by Med Res Council) 1944 Jan v 3 2-7

A brief and lucid account which medical men called upon to deal with malaria would do well to study.

Charles H Wilcocks

TAPEJEV I M GONTALEVA A A & ROTENBURG S S [Fulminating Type of Tertian Malaria] *Sovetskaja Medicina* [=Soviet Medicine] 1943 No 4 12-14 [In Russian]

This is a further contribution to the question of the fulminating form of tertian malaria due to *P. vivax* [see also this *Bulletin* 1943 v 40 436 668]. Working in central Russia (in 1941) the authors have observed among children and youths varying in age from 4 to 17 years but mainly between 6 and 12 a peculiar condition with grave symptoms terminating fatally after a few hours. In most cases the local physicians failed to associate the severe clinical picture with malaria but attributed the disease to an infection of the nervous system of unknown origin.

The present observations have shown that the cerebral manifestations occurred during the second or even first regular paroxysm of the tertian type. As a rule on the day before the severe attack the children would feel quite well and have a normal appetite. Sometimes they even went to school in the morning of the day when the attack took place. The paroxysm of fever generally started suddenly with a rapid development of unusual symptoms (very severe headache shrieks vomiting convulsions foam at the mouth loss of consciousness Cheyne Stokes respiration) terminating in death 2-3 hours later. It was rarely possible to examine the patients carefully during their life. In 12 out of 17 cases the examination of blood films (*ante et post mortem*)

[April 1944]

revealed *P. malar*. However contrary to what is found in the comatose form of subtertian malaria only single parasites were seen in the cerebral capillaries.

After describing the anatomico pathological finding the authors conclude that death in their cases was due to anoxia of the brain accompanied by the cessation of its fundamental functions owing to cerebral swelling. There was no evidence of the action of specific toxins upon the brain. Thus fulminating form of tertian malaria is attributed to the individual reactions of the host rather than to any peculiarity of the strain of plasmodium.

Prognosis is very grave but in some cases the injection of a full dose of quinine or acquine (atebrin) immediately the cerebral symptoms had manifested themselves saved the lives of the children. It is therefore suggested that such cases should be treated as promptly as possible on mere suspicion of malaria.

C. A. Hoare

KERKHCHER O. M. [On Protracted Cases of Malaria according to Materials of the Batum Central Tropical Station] *Med. Parasit. & Parasitic Dis.* Moscow 1942. 11 No 6 36-7 [In Russian]

In a number of recent Russian works (the Bulletin 1943 v 40 345) it has been demonstrated that the duration of acute cases of malaria does not usually exceed one year. This was also confirmed by the author in the Adjara Republic (Caucasus).

In this locality, such as formerly a hyperendemic area of malaria, reduced the incidence of infection. Thus in 1940 the parasite index was 0.5 per cent (0.2 per cent) and the introduction of new groups of non immune persons did not result in an increase of cases of malaria while the number of new infections amounted to 187 in 1939 and 16 in 1940.

These data would seem to indicate that the malaria situation in Adjara is highly satisfactory. Nevertheless the number of malaria cases registered every year continued to be very high a fact which appeared to contradict the above conclusions. However an examination of the record for the preceding five years showed that only in a small proportion (10 to 20 per cent) of the cases attributed to malaria was the diagnosis confirmed by the finding of the parasites the condition in the majority of patients being registered as chronic malaria without objective evidence.

The examination of over 500 of such patients confirmed the impression that they were not suffering from malaria at all though they themselves attributed all their ailments to this disease. It is pointed out that such cases of pseudo-chronic malaria are highly misleading and they should be excluded from local record otherwise they tend to give an erroneous picture of the epidemiological situation and may affect the planning of anti malarial campaigns.

C. A. Hoare

HELDY T. J. & GODER G. A. Agranulocytosis following Malarial Therapy in General Paresis. *J. Nervous & Mental Dis.* 1943 Sept. v 98 No 3 248-54

Agranulocytosis as a complication of malarial therapy has not hitherto been reported in English medical literature. Four such cases have however been described in German medical journals. The present

case is that of a male aged 45 suffering from dementia paralytica. On September 24th he received an intravenous injection of blood from another patient undergoing malaria therapy with *P. malar*. On the 28th he had a chill with a temperature of 104.5 F. During the following 2 weeks he had 12 chills with in all 48 hours of fever above 104.5 F. On October 14th the temperature rose to only 103 F so on the following day when the temperature again rose an intravenous injection of 25 million killed typhoid organisms was given with a subsequent rise of temperature to 106 F. On the 18th the temperature reached 106.2 and 20 grains of quinine were given in two doses. The fever did not subside. The patient died on the 19th. On admission to hospital a blood count revealed 9400 white blood cells per cmm of which 62 per cent were polymorphonuclear. On the day of his death leucocytes numbered only 750 of which 90 per cent were large lymphocytes, 2 per cent small lymphocytes and 8 per cent monocytes. Clinical conditions and post mortem findings are described at some length. [The thesis that malaria was responsible for the agranulocytosis does not appear to rest on very solid foundations.]

Norman Whit

DE ZULUETA J. Esquizogonia del *Plasmodium falciparum* en la circulacion periferica. [Schizogony of *P. falciparum* in the Peripheral Circulation]. *Rev. Facul. de Med.* Bogota 1943 May 11 No 11 650-64 4 figs on 1 pl. [23 refs.]

Of 164 cases of malignant tertian malarial infection studied in Bogota schizonts were seen in the peripheral blood in 2.4 per cent of the cases. All were typical of *P. falciparum* infections and they all responded readily to antimalarial treatment. There was no indication that the cases with schizonts in the peripheral blood were of special severity as is the usual claim for such cases in other districts. The author believes that there exist certain strains of *P. falciparum* which reproduce normally by schizogony in the peripheral blood and that in Colombia such forms are of more frequent occurrence and of less grave significance than they are elsewhere.

C. M. Wenyon

SALSDON I. B. A Fatal Case of Cerebral Malaria. *Brit. Med. J.* 1943 Dec 25 814-15.

A stoker from a war ship was admitted to a naval hospital in a semi-comatose condition. He had suffered from severe headache for three days but had not reported sick as he wanted to go on leave. His ship had been at Sierra Leone two weeks before he fell ill, a fact which was unknown to the hospital authorities. The possibility of a meningococcal infection prompted the immediate administration of 1 gm. sulphapyridine intramuscularly. Subsequent investigation revealed the presence of numerous ring forms of *P. falciparum* in the peripheral blood. There was a moderate leucocytosis with a raised monocyte count. There was no neck rigidity, no positive Kernig's sign and no paralysis of the limb. The pupils were pin point, there was incontinence of urine. An intravenous 5 per cent glucose saline drip was given. Into the rubber tubing of the drip apparatus was injected slowly with a hypodermic syringe a solution containing 10 grains of quinine dihydrochloride and 10 min. of 1/1000 adrenaline hydrochloride in 20 cc. of water. The following day the condition was

much improved but there was persistent vomiting. Another injection of 10 grains of quinine dihydrochloride was given in the same manner as before. On the 3rd day the temperature rose to 104 F and the patient relapsed into coma. The quinine treatment was again repeated and 10 cc of clear fluid were removed by lumbar puncture. The patient died on the 5th day. Post mortem findings were characteristic of cerebral malaria: there were numerous petechial haemorrhages throughout the brain, most numerous in the cerebral hemispheres.

Norman White

CAMERON I G. Cerebral Malaria. [Correspondence.] *Brit Med J* 1944 Jan 22 127-8

Cameron refers to the patient reported by SNEDDON [above] who died after having received several intravenous injections of quinine. Cameron stresses the importance of not sparing quinine and advocates in such cases two or even three intramuscular injections of 15 grains daily. Two or three injections usually suffice but if vomiting or coma persists the injections must be continued until these signs disappear. The largest number he has given to any individual patient is 14 injections over a period of seven days. In an experience lasting 14 years in a part of Malaya where cerebral malaria was common and where the strain of *P. falciparum* was infinitely more virulent in this respect than the West African, very few cases were lost. He has never seen untoward results or abscesses but insists of course on absolute sterility and the need to ensure that the injection is in fact made into muscle. Energetic treatment with injection of at least 30 grains daily would greatly reduce the number of fatal cases.

He points out that in cerebral malaria parasites may be very scanty in the peripheral blood.

Charles H. H. H. H.

- 1 BURTON A F & KELSEY F E. Studies on Antimalarial Drugs. The Metabolism of Quinine in Pregnant Animals. *J Pharm & Exper Therap* 1943 Sept 79 No 1 70-76 3 figs. [19 refs.]
- 2 KELSEY F E & OLDRHAM Frances K. Studies on Antimalarial Drugs. The Distribution of Quinine Oxidase in Animal Tissues. *Ibid* 77-80
- 3 OLDRHAM Frances K & KELSEY F E. Studies on Antimalarial Drugs. The Influence of Pregnancy on the Quinine Oxidase of Rabbit Liver. *Ibid* 81-4

1 SAILER DILLING and GEMMELL (this Bulletin 1931 v 28 848) and others have shown that quinine when given to induce labour is found in foetal tissues in doses capable of toxic effects. The present investigation deals with the metabolism of quinine in the maternal rabbit and foetus during the whole course of pregnancy after intravenous or oral administration to the mother. The animals were sacrificed one hour or longer after receiving the drug and the quinine content of tissues was estimated by the method of KELSEY and GEMMELL (*J Pharm & Exper Therap* 194 75 183).

In the foetus the concentration of quinine was highest at the 12th day, dropped gradually till the 23rd day and then increased till term at the 31st day. When pregnancy was prolonged by Gonadogen there was a diminution in quinine content of post term foetuses. The amount of quinine in the tissues decreased rapidly as the interval between

administration and estimation was increased. The foetal portion of the placenta contained more of the alkaloid than the maternal portion and the former by storing quinine or impeding its passage affords some protection to the foetus.

In the mother the lowest concentration of quinine in the tissues was found at the end of the second trimester [20th day] and there was a rise in concentration as term approached indicating a loss of ability to destroy the drug. In the rabbit tissue values were low compared with those in other animals. This was specially true of the liver which is very effective in destroying quinine. The maternal tissues were shown to contain quinine after injection into the foetus. It appears that the liver of the non pregnant rabbit is better able to destroy the drug than that of the pregnant rabbit. The above results may have marked significance for man.

ii It is well known that certain animal tissues destroy quinine *in vitro* [see LIPIN in this *Bulletin* 1920 v 15 127]. The metabolic product has not been identified nor is it certain whether it or the parent alkaloid is the active agent in malaria.

Quantitative studies have been made by the authors on the distribution in various animal tissues of the agent responsible for the breakdown of quinine. Since oxygen is known to be essential for this reaction they have termed the substance quinine oxidase and preliminary work suggests that the metabolite is in fact an oxidation product. The fresh tissues were macerated in Ringer Locke solution strained through muslin and incubated with known amounts of quinine for various periods at 37 C. The quinine then present was estimated. Rabbit liver was more active in the destruction of quinine than that of other laboratory animals. Human liver was comparatively inactive. There was a great variation in the activity of the other tissues examined. The disappearance of quinine administered to the living animal is correlated with the amount of quinine oxidase in the tissues.

iii The effects of pregnancy on the activity of quinine oxidase of rabbit liver *in vitro* and the time of its appearance in the foetus have been investigated. Livers of rabbits from the 20th day of pregnancy till the 42nd day after delivery as well as those of non pregnant animals were obtained fresh and incubated with quinine as described above. Foetal and young rabbit livers were used in the same way.

It was found that quinine was destroyed by the liver more slowly in late pregnancy and early in the post partum period than in control animals. The organ had regained normal activity 42 days after delivery. Loss of activity appears to be due to lack of quinine oxidase rather than to some inhibitory mechanism. The results for normal animals were very constant. The enzyme is present shortly after birth and maximum activity is reached at the time of weaning. In severe parasitic infections of livers the oxidase activity was reduced.

J. D. Fulton

KIRZOV M. I. [Treatment of Malaria in the (Russian) Army]
Sovetskaya Medicina [=Soviet Medicine] 1943 No 4 14-15
[In Russian]

In the autumn of 1942 there was a considerable increase of admissions for malaria in a certain military zone of U.S.S.R. Although the majority were cases of benign tertian malaria (as established by blood examination) the symptoms were mostly like those of subtertian (stupor coma).

The author found that the most effective treatment was by intra muscular injection of acriquine [atebrin]. This was introduced either in doses of 12 cc of a 2.5 per cent solution of the powdered hydrochloride or in doses of 10 cc of a 3 per cent solution of the tablet (each dose containing 0.3 gm pure acriquine). In the latter case the tablets were dissolved in water heated to 70 C and filtered twice through 3-4 layers of gauze. The resulting transparent solution was sterilized and its concentration was determined colorimetrically (by comparison with a solution of powdered acriquine of desired concentration).

As a rule one or two injections were sufficient to suppress the paroxysms of fever but as an extra precaution the treatment was continued for two or three days longer the whole course consisting of 3-4 injections spread over the same number of days.

This treatment proved to be highly successful in all cases (more than 200) including comatose forms (13). It also compared favourably with the oral method of administration of acriquine in that (1) the period of treatment is reduced (on the average 3.2 days as compared with 4.35 in the latter) and (2) the cure is more lasting (only 2 cases relapsed).

In a number of cases beneficial results were obtained by blood transfusion accompanied by administration of 0.1 gm acriquine three times daily immediately after suppression of the malarial attack. This treatment invariably brought about 15-20 per cent increase of haemoglobin and a marked improvement in the general condition of the patient.

C. A. Hoare

SCUDY J. V. & HAMLIN Margaret T. Distribution and Excretion of Atabrine in Experimental Animals. *Proc Soc Exper Biol & Med* 1943 Oct 34 No 1 127-31

The concentration of mepacrine (atabrine) was determined by a modification of Hecht's procedure for details see original see also HECHT this Bulletin 1936 34 157. It is claimed that concentrations between 1 and 10 gamma per cc could be measured within instrumental error. The results were multiplied by correction factors of 1.09 to 1.3 according to the results of control estimations on the various tissues concerned. The figures include various degradation products of mepacrine (presumably inactive therapeutically) which were not distinguished from unchanged mepacrine by the method used. When rats were given a single oral dose of 250 mgm per kgm the blood concentration was maximal at half an hour (1.3 mgm per 100 cc) and after six hours it fell to 0.3 mgm per 100 cc. When a dog was given 100 mgm per kgm by mouth the concentration in the blood was 0.26-0.50 mgm per 100 cc over the period $\frac{1}{2}$ to 24 hours. A group of rats was given an oral dose of 250 mgm per kgm after 1 day the liver contained 0.6-1.2 mgm mepacrine per gm of wet tissue and the spleen 0.15-0.2 mgm per gm after 14 days the liver contained 0.1-0.7 mgm per gm and the spleen 0.1-0.2 mgm per gm. In rats which received 12 daily doses of 45 mgm per kgm the liver often showed necrotic areas. The daily output of mepacrine in the urine (after 250 mgm per kgm) was small ranging from 0.45 to 0.99 mgm on the first day and 0.74 mgm on the 13th day. The urinary output was not proportional to the dose administered. A monkey was given 7 doses of 300 mgm per kgm by stomach tube during a three week period and was then killed.

the concentration of mepacrine in the organs was—liver 1.4 mgm per gm wet tissue kidney 0.23 mgm small intestine and brain each 0.1 mgm muscle and lung each 0.30 mgm per gm. When a dog was given four doses of 200 mgm per kgm by mouth within 1 week the faeces contained about 22–31 mgm per day mepacrine for 4 days after the last dose.

[Since the authors' method did not distinguish mepacrine from inactive degradation products the figures represent maximum values the dimensions of the minimum values are unknown. In view of this only an illustrative (but incomplete) reproduction of the data has been attempted and the original paper should be consulted by those interested.]

F. Hawkins

SCUDI J. V. & HAMLIN Margaret. Effect of Atabrine on the Urinary Porphyrin Output in the Rat. *Proc Soc Exper Biol & Med* 1943 Oct 1 & 54 No 1 132–4 1 chart

Daily oral administration of toxic doses of mepacrine to rats does not produce an increased output of coproporphyrin in the urine.

F. Hawkins

WILSON D. Bagster & MILVILLE A. R. The Control of Malaria East African Command 1940–1943. *J Roy Army Med Corps* 1943 Nov & Dec 1 & 81 Nos 5 & 6 213–22 203–8

Troops of the East African Command have served in places which extend over half the length of Africa and consequently the risk of malaria to which they have been exposed has varied greatly. Some areas are free from malaria—these include parts of the central African highlands of Kenya, a large part of central Ethiopia and smaller areas of Tanganyika and Madagascar. In these places the low temperature associated with high altitudes inhibits transmission. A large part of North Kenya and the greater part of Somalia are so hot and dry that anopheline breeding is limited to the neighbourhood of permanent rivers or seasonal streams. At the other extreme malaria transmission continues throughout the greater part of the year on the east coast of Tanganyika of Kenya and of Madagascar as well as in most of Uganda and central Tanganyika. Between these two extremes seasonal malaria occurs in Northern Rhodesia and in the Rift Valley of Central Ethiopia. The anti-malarial organization of the Command has therefore had to deal with a very great variety of conditions. The very high measure of success achieved endows with special interest the authors' description of the control measures employed.

Much of the control work has been carried out by Mobile Malaria Sections consisting of African labour and semi-skilled Africans and Europeans. Educated Africans are given a three to four months course of preliminary training and then become Malaria Assistants. The best of these can be trained eventually to carry out simple surveys and to run simple controls without immediate European supervision. European N.C.O.s have done good work. Those with good general education learn sufficient about the practice of anopheline control, identification of Anopheles and field surveys to make them useful members of units within a period of weeks. After experience in the preliminary stages of the East African campaign the standard of surveys made by the Mobile Malaria Units has been high.

There have been but few examples of high malaria rates among first line troops in forward areas. The temporary absence of a local infective population possibly explains this for only very partial protection can be afforded such troops. Settling down near to water and native villages has sometimes produced severe malaria. Since the anti malarial organization has become adequate in size it has hardly ever been found impossible to reduce European malaria incidence in more permanent camps within a few weeks to less than 100 per cent per annum.

Emphasis is laid on the importance of malaria mindedness among all ranks. Some units have only learnt the importance of this by bitter experience. Good siting of camps is the most important single anti malaria measure. Even in the worst areas there are parts which are less bad. Half a mile and whenever possible one mile from obvious main anopheline breeding places are regarded as minimal distances with a similar avoidance of native villages. The site should be reasonably well sloped and camp construction should avoid interference with natural drainage. Track discipline is important. rain filled car tracks can produce enormous numbers of *A. gambiæ*.

Personal protection including the use of protective clothing during hours of darkness and the proper care and use of the mosquito net are the first line of defence. This is a matter of unit discipline. There was a striking difference in Madagascar between the malaria incidence of freely arrived United Kingdom troops and of Europeans of East Africa units camped on the same site. There was difficulty at first in obtaining mosquito netting of sufficiently small mesh to exclude *A. f. s. s.* In a bivouac the corners of the net are tied to sticks cut suitable. In a bivouac the corners of the net are tied to sticks cut from the bush and tucked in the ground. Little use has been made of repellents. Where regular night duty is involved the employment of the minimum number of men is essential. Head nets are rarely effective in practice.

Pyrethrum spraying of adult mosquitoes is an essential measure of military malaria control and is always practicable. An evening spraying at dusk with an early morning spraying in specially malarious areas is recommended. In bivouacs such mosquito shelters as vehicles boxes of bedding treeholes and patches of dense bush near sleeping places require attention. In example is given of a camp in which personal protection combined with the killing of adult mosquitoes reduced malaria rates by at least two-thirds.

Anti larval measures have been more employed in static camps than in forward areas but such measures are now regarded as a routine in almost any circumstances with the resulting assurance that the control of malaria can be achieved in most unpromising conditions. The larvicide used has been one part of solar oil to 10 parts of diesel fuel oil. When control is urgent oiling is commenced at once over as large an area as possible pending the completion of a survey. Intensive anti adult measures being also carried out from the start. Simple drainage may often reduce the areas of water to be oiled. Rapid clearing of *A. f. s. s.* breeding places may result in a remarkable diminution of the prevalence of this species. The efficacy of antilarval work is always controlled by weekly adult catches. An estimated suppressive treatment has been little used. An estimated malaria rate of 10 per cent per month has been adopted as a very

rough criterion for the necessity of imposing suppressive treatment and on only isolated occasions has control by other methods been so ineffective that the necessity has arisen

The report contains statistical information regarding the incidence of malaria in different areas which bears testimony to the success achieved by the Malaria Control Organization of the East African Command. The last conclusion of a remarkable report reads: "There is no royal road to the control of malaria in war but by the application of all anti mosquito measures to the maximum extent possible under the particular circumstances prevailing it has proved possible to reduce malaria to a level at which it does not cripple the efficiency of units without the use of suppressive treatment." *Norman White*

ZUMPT F. Der Flugzeugeneinsatz in der medizinischen Schädlingbekämpfung [The Aeroplane in Mosquito Control] *Deut Tropenmed Ztschr* 1943 July 1 v 47 No 13/14 360-68 [Numerous refs]

In an introductory summary the author states that the aeroplane was first used in anti mosquito work for surveying by MUELLER in Thrace in 1917 and by HEWITT in Canada in 1919. As a means of scattering Paris green (copper acetoarsenite) over breeding places of Anopheles it was used first in the United States of America in 1923 then in Northern Italy in 1927 [MISSIROLI this *Bulletin* 1928 v 25 155] in Russia in 1928 and in Portugal in 1932 [TIGUEIRA & LAMDEIRO *ibid* 1933 v 30 497]. It was used in Madagascar in 1932 and in Morocco in 1934 in Indo China in 1935 [MORIN & MARTIN *ibid* 1934 v 31 469] and in India in 1937 [COVELL & ARIDI *ibid* 1937 v 34 638]. In Germany it was used against forest pests in 1921 but not in antimalaria work. In 1941 however it became necessary when the German troops occupied the eastern and south-eastern malarious districts of Europe and a number of aeroplanes were therefore sent to Greece, Serbia and the Ukraine.

Several factors have to be considered when using this method of scattering Paris green over Anopheles breeding places: the particles should not be more than 30μ in diameter to enable the first stage larvae to ingest them; street dust as a diluent of the poison is heavy and talc was found to be the best of several other substances tried (wood ash, slaked lime, kieselguhr &c) owing to its lightness. The toxicity of the poison, the thickness of the vegetation, the susceptibility of valuable plants e.g. rice have to be taken into consideration. The kind of scattering mechanism and the speed of the aeroplane affect the quantities required. Generally about 1 kgm of pure Paris green per hectare (2½ acres) of surface is used but as little as 200 gm or as much as 2 kgm may be needed. For rice fields in order to avoid damaging the plants a mixture containing from 1 to 5 per cent of the poison is suitable but for ordinary use the dilution has generally been about 1:3. When calcium arsenite and sodium arsenite were tried it was found that 3-4 times the amount was required.

Oiling from an aeroplane is costly and only effective where there is little vertical vegetation (bushes, reeds &c) the usual amount is about 200 litres per hectare. It was used with good results in New Jersey in 1932.

Early in 1942 the author was sent to conduct antimalarial work in the Ukraine and used aeroplanes around Kherson near the mouth of

[April 1944]

the River Dnieper the Bulletin 1944 v. 41 4 Two aeroplanes were supplied one being fitted to spray liquids and the other to scatter dust they had two engines and could reach a speed of 180 km per hour The oil sprayer machine was used only 3 times and was found unsuitable as the bushes were too thick but the other machine proved to be very effective A wagon load of calcium arsenite and some tons of Paris green belonging to the Russians were used Laboratory tests with calcium arsenite made by Weier in Hamburg in 1941/42 had shown that Anopheles larvae of the 4th stage were killed in 30 minutes nearly all younger larvae in 24 hours and some culicine larvae after 5 hours pupae surviving

A suitable diluting material had to be selected The scattering apparatus of the aeroplane was easily damaged by coarse street dust which was also too heavy so until a fine sieve and new apparatus could be fitted and as the matter was urgent the author tried pure calcium arsenite This left the aeroplane as a thick cloud which slowly spread as it sank to a breadth of 150-200 metres of which about 30-40 metres were effective About 1500 hectares were thus treated After a new sieve had been fitted he tried a mixture of 1 part of Paris green and 20 parts of street dust the cloud was not so broad as with pure calcium arsenite and with a load of 1500 kgm only about 15 hectares could be covered on average of 100 kgm per hectare or about 45 kgm of Paris green per hectare This is a very large amount with a high diluting material many times this area could have been treated with a less concentrated mixture

From this experience this type of machine will use in future only very light diluting materials such as talc the least amount of mixture distributed per hectare will be about 20 kgm With Paris green about 18-19 parts of diluting material will be required and perhaps about 15 parts for calcium arsenite

The author concludes with a reference to the possible use of the aeroplane against other pests the breeding places of culicine mosquitoes (especially those of Aedes in North and Central Europe and in North America) are suggested but they are some that thickly covered with vegetation Another suggestion is to use it to destroy tsetse flies in the savannah country of Africa in the dry season the author thinks that a poisonous powder scattered as a cloud might kill the flies by direct contact and thus solve the tsetse problem in such areas

HILBERT H S Observations on the Use of Sea Water in the Control of Anopheles albimanus Wied J Parasitol 1943 Oct 1 29 No 336-60

The deliberate increase in salinity of coastal lagoons in the West Indies is used to eliminate breeding of Anopheles albimanus The author's experiments and observations tend to define the insect upper limit of salinity If wild females are confined in specimen tubes with various dilutions of sea water it is found that there is a regular fall in the proportion which lay eggs (a third doing so in 25 per cent sea water or distilled water a tenth in 80 per cent sea water) but there is also a fall in the percentage of eggs which hatch (under 10 per cent at 70 per cent sea

water under 1 per cent at 80 per cent) There are therefore two ways in which a higher salinity reduces the output of larvae

The author also finds that if he rears mosquitoes from the egg in dilutions of sea water with dried yeast he gets a 2 per cent yield of adults or less at 75 per cent sea water If larvae are hatched in brackish water to which sea water is added a small proportion can become adult even if the final concentration is equivalent to 80 per cent sea water

The salinity of a lagoon was increased by making openings to admit sea water and permit of tidal action To eliminate breeding the salinity should reach 75 per cent of that of sea water except that after heavy rain it may be much lower for short periods P 4 Burton

BISPHAM W N Malarial Immunity *Southern Med J* 1943 Sept v 36 No 9 636-9 [12 refs]

BECKMAN H & SMITH Jane A New Method of counting Plasmodia in Avian Malaria Infections *J Lab & Clin Med* 1943 Nov v 28 No 14 1735-40 1 chart

In a previous paper [this *Bulletin* 1941 v 38 566] Beckman described a method of estimating the degree of malarial infection in birds based on the number of minutes occupied in counting twenty parasite Subsequent experience has shown that this method was not sufficiently delicate to record slight difference It has accordingly been modified as follows The number of parasites counted under the one twelfth inch objective in three minutes in successive fields of a part of the blood film where the red cells are not overlapping is taken as the index of infection It was found by experience that though films and individual fields vary as regards density of red cells the number of cells inspected for parasites in three minutes varies very slightly from slide to slide so that the index obtained is of sufficient accuracy for the estimation of degrees of infection C M Wenyon

RELMOND W B & PRATHER R M Jr Variations in the Asexual Cycle of Plasmodium when transferred to an Abnormal Host *J National Malaria Soc* Tallahassee Fla 1943 v 2 No 1 25-9 2 figs [10 refs]

With a view to estimating the effect of the host on one species of bird malarial parasite the I P strain (the pigeon strain of *P. relictum* originally isolated by COATNEY in 1938 from a young pigeon) was studied in pigeons and canaries In both these birds satisfactory infections occur which are pathogenic and sometimes fatal As was described by Coatney the parasite in the pigeon shows a high degree of synchronicity the interval between two peaks of sporulation being 27 hours In the canary there is a somewhat higher degree of synchronicity the interval between the peaks being reduced to 24 hours The only morphological difference noted is that in the pigeon the number of merozoites averaged 8.54 (extremes of 6 to 14) while in the canary the average was 9.15 (extremes of 6 to 16) The authors point out that this is the first instance in which the same parasite has been studied in two strictly comparable hosts for neither the canary nor the pigeon shows any age resistance to the infection while the immune reactions to superinfection are the same in both

C M Wenyon

[April 1944]

MANWELL R. D. *Tropical Diseases Bulletin* [April 1944]
In the Duck and Chicken and resulting Parasite Modifications —
As: / Hys 1943 Sept 1 38 No 2 211-22 15 figs on 2 pls
[14 ref]

An investigation on four species of bird malarial
untained in canaries has shown that the
them. These parasites are
lephlum and P. ...

An investigation on four species of bird malarial parasite usually maintained in canaries has shown that the duck is a good host for all of them. These parasites are *P. circumflexum*, *P. donatum*, *P. microphylum* and *P. helveticum* var. *malinum*. This would indicate that for chemotherapeutic studies in these birds *P. lophurae* no longer necessary to limit these to the single species *P. lophurae* which is most commonly maintained in the duck. Observations mentioned in the paper indicate the probability that *P. cathemerum* and possibly other species may give rise to satisfactory infections in the duck. For all these species with the exception of the one most pathogenic (*P. circumflexum*) the duck's resistance to infection increases with age. Feverythrocytic stages have not been found in ducks though young chickens have been readily infected with *P. athemerum*. Young chickens have produced mosquito infections with *P. circumflexum* and *P. helveticum* var. *malinum* but *P. microphylum* gave rise merely to a mild and transient infection and *P. donatum* similar to that in canaries but in the chicks on account of a greater resistance of the erythrocytes to distort on conspicuous alterations occurred. During the course of the investigation it was noted that the strain of *P. microphylum* used had ceased to produce gametocytes.

BARIETTO M P Infeção do
 Plasmodium catheneru n
 P cath neri m Act Med
 11 No 4-5 68-73 2 fig on 1 pl English summary
 This paper records observations on attempts to
 infect *Plasmodium catheneru* to *Anopheles*
 and on the possibility of the investigation it was noted that
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 Anopheles (N) noroestensis pelo
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 Rio de Janeiro 1943 Apr-May
 1943 Apr-May

Anopheles (A.) noroestensis pelo
Infection of *A. oest* is s with
Rio de Janeiro 1943 Apr-May
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on attempt

This paper records observations on attempts to transmit *Plasmodium californicum* to *Anopheles* (*1*) *isotus*. Forty-one specimens of this mosquito were fed on a bird (*Br. cal. p. fulcata*) naturally infected with *Plasmodium californicum* and maintained at 25°C and 80-100 per cent humidity. Dissected from 6 to 15 days after the infective meal five mosquitoes (12 per cent) were found to harbor oocysts in their mid gut. No sporozoites were observed in the salivary gland although one mosquito showed a large oocyst containing sporozoites.

Rts 111 Paul H. ROZEBOOM Lloyd E.
the Anoph. line Mosquito.

This book is

Rts 111 Paul J. ROZEBOOM Lloyd E & STONE Alan Keys to
the Anoph line Mosquito s of the World
This book is reviewed on p 3

TRYPANOSOMIASIS

- 1 CHORLEY J K. Tsetse Fly Operations A Short Survey of the Operations by Districts Bull No 1177 Dept Agric Southern Rhodesia 1941 July 9 pp
- 11 ——— Tsetse Fly Operations 1941 Short Survey of the Operations by Districts for the Year ending December 1941 Bull No 1208 Dept Agric Southern Rhodesia 1942 6 pp

[These two reports survey briefly the work done during 1940 and 1941 in the campaign against the tsetse fly in Southern Rhodesia. When these measures were begun (see JACK this *Bulletin* 1926 v 23 719 1931 v 28 522) the aims were stated to be to reduce game along the edge of fly infested country to create and maintain game free zones ten miles or more wide beyond the farm boundaries and to control motor traffic of hunters and prospectors. It was also considered necessary to increase facilities for entomological and biological research.

In the report for 1937 (this *Bulletin* 1939 v 36 673) controlled game destruction and the creation of fly free zones were said to be no longer in the experimental stage and they could be applied on the edge of the fly belt wherever land was required for development. The opinion was expressed that the tsetse fly could be eradicated from all the infested areas in the colony by judicious extension of controlled game destruction over a period of years, game sanctuaries being established in areas clear of fly. In areas where elephant and rhinoceros were abundant clearing of thicket and bush might be required.

In 1939 (this *Bulletin* 1942 v 39 443) the position in the northern areas was regarded as very satisfactory. Altogether at least 6 000 square miles had been cleared of tsetse and fly infested districts were relatively remote from European settlements, native cattle had returned to cleared areas and roads had been opened to transport. Near the Portuguese border in the south east (Metsseter District) however there had been a considerable loss of cattle from trypanosomiasis. *Glossina brevipalpis* and *G. pallidipes* were crossing from Portuguese territory and *G. morsitans* was approaching the border near the southern end of the district in the Sabi valley.]

1 During 1940 operations in the north were carried on over a front of 100 miles from Darwin to the west of the Angwa River. The cleared area remaining about the same in extent as about 6 100 square miles. Cattle were introduced for the first time since 1912 near the junction of the Kana and Shangani rivers. In the Metsseter District the position had improved, only 132 suspected cases of trypanosomiasis in domestic animals having occurred compared with 1 000 in the previous year. 20 were definitely diagnosed by blood smears. Fly traps of which 215 had been erected caught a total of 22 tsetse (14 *G. brevipalpis* and 8 *G. pallidipes*) and 32 were caught by hand. Owing to the advance of *G. morsitans* in the lower Sabi valley shooting of game was under taken. The position in the various districts—Darwin Doma Area, Urungwe, Lomagundi S.W., Gatooma, Sebungwe and Metsseter and the Sabi Valley—is briefly reported. A total of 15 509 wild animals were shot at a cost of 2.2 rounds of ammunition per head. Research included a study of the physiological condition of *G. morsitans* adults attracted by man and motor vehicles respectively [see JACK this *Bulletin* 1940 v 37 400].

[April 1944]

The year 1941 is described as one of quiet but effective consolidation of the newly occupied advanced positions. An intense effort was being made to render the whole of the Urinwe Native Reserve safe for cattle and the number of native hunters employed was considerably increased. A large scheme of native settlement in this area during 1942 was planned. Owing to the low density of the present native population and the absence of cattle over most of the area little soil erosion has occurred in the past the land is virgin and fertile compared with most native areas and with the development of water supplies capable of holding a fairly dense native population. This is the first planned scheme of native settlement to be undertaken on land reclaimed from the tsetse in the Colony. The demand by the natives for more grazing is urgent. In the Melsetter District animal trypanosomiasis had increased and was more widespread. Only 1 tsetse (*G. brevipalpis*) and 9 (*G. pallidipes*) were caught in traps while 35 (14 *G. brevipalpis* and 21 *G. pallidipes*) were caught by hand. 22 of the 35 were caught on the Rhod side of the border. In the Sabi valley 11 deaths of domestic animal from trypanosomiasis at the Honde Dip were definitely diagnosed. A total of 20 wild animals were shot during the year at a cost of 1 round of ammunition per head. Notes are given of the position in the various districts and of traffic control.

Cameroons J F Co
L b e 1943 Mar Sci M t Ph 1 a ça (Tsetse Flies in French
I A K H A N I A A Infectivity of the Texas Strain of *Trypano*
309-14 1 fig 18 ref J T p M t 1943 Mar 23 No 3

Though six species of *Trypano* are known to be naturally infected with flagellates and tsetse flies from *Trypano* in the United States especially in Texas (California, Nevada and Arizona) up to the present no human case of Chagas's disease has been recorded from North America. Furthermore it was not known whether the flagellates in the local bug were infective to man. The experiments described in this paper were carried out with a view of solving this question.

In adult negro man was inoculated with material from an infected *Triatomus* (known in Texas) introduced into the feet. He contracted an infection and showed symptoms of Chagas's disease a fortnight after exposure. The chief clinical findings consisted of acute oedema and hyperaemia of the eyelids and conjunctiva enlargement of the axillary lymph nodes and low grade fever. Trypanosomes were demonstrated in the patient's blood from 21 to 63 days after infection. They also appeared in blood cultures in experimentally infected rodents and monkey and their presence was confirmed by venodiagnosis. After a period of 84 days all tests designed to reveal the presence of trypanosomes were negative.

The present study demonstrates that the Texas strain of *Trypano* originating from local *Triatomus* is capable of infecting man with a disease clinically identical with Chagas's disease.

C 4 He

DAVIS D J Infection in Monkeys with Strains of *Trypanosoma cruzi* isolated in the United States *Pub Health Rep Wash* 1943 July 2 v 58 No 27 1006-10 1 pl

Although infections with flagellates indistinguishable from the developmental stages of *Trypanosoma cruzi* in its vector have been recorded repeatedly from Triatomid bugs in USA no human cases of Chagas's disease have yet been reported from North America. Since one of the commonest symptoms of the human disease in South and Central America is a unilateral oedema of the eyelids (Romaña's sign) which can be reproduced experimentally in monkeys the author conducted a series of experiments to ascertain whether this phenomenon appeared in monkeys inoculated with United States strains obtained from local bugs.

The material was obtained from naturally infected *Triatoma gerstaeckeri* collected in Texas and *T. protracta* from California as well as from laboratory bred specimens of the former species experimentally infected on desert mice (*Peromyscus eremicus*) previously infected from a Texas bug strain of *T. cruzi*.

With these strains seven macaque monkeys were inoculated by dropping into one eye some faecal material from infected bugs while three monkeys served as controls and were similarly infected with human strains of *T. cruzi* from Venezuela and Panama obtained by feeding *Triatoma longipes* on infected desert mice.

Trypanosomes indistinguishable from *T. cruzi* appeared in the blood of all the monkeys while Romaña's sign developed in three of the seven monkeys inoculated with US strains. Biopsy was performed on a swollen lid of one of these. When examined histologically sections revealed fibroblast proliferation and focal infiltration (chiefly perivascular) by lymphocytes plasma cells and large mononuclears. Leishmanial forms of the parasite were found at the site of infiltration and motile crithidia were seen in saline used for the perfusion of the eyelid.

Complement fixation tests were done on the 10 experimental monkeys with an antigen made with a Panama strain of *T. cruzi*. The sera taken before the experimental inoculations were negative but those taken after the animals became infected all fixed complement.

C 1 Hoare

LEISHMANIASIS

BOIX BARRIOS J Kala azar infantil antimonio y sistema reticulo endotelial (trabajo basado en ciento sesenta casos de kala azar infantil de observacion personal) [A Study of Infantile Kala Azar Antimony and the Reticulo endothelial System based on 160 Cases under Personal Observation] *Med Española* 1943 Apr & May v 9 Nos 51 & 52 412-26 522-34 5 figs [Bibliography]

Not infrequently the primary effect of an antimonial in the treatment of infantile kala azar is a negative phase in which all the symptoms are accentuated. This is particularly marked in the blood picture and in the degree of splenomegaly. Following this there is a general amelioration the temperature gradually returns to normal the skin regains its proper colour and the spleen becomes reduced in size. In some cases the spleen does not regain its normal size till some time after

the course of treatment is completed while parasites are still demonstrable though return to health appears to be complete. In such cases it is inadvisable to discontinue treatment.

As regards the action of antimonials on the parasite the author states that the older view of EHRLICH that some special affinity exists between the drug and the parasite has been abandoned. The therapeutically effective drugs are without action on the parasites *in vivo*. It has been noted that during treatment actual degeneration of parasites can be observed but it is claimed that this has reference only to those that are extracellular. Nevertheless it is a fact that the intracellular parasites gradually disappear. These changes must be due to alteration in the fluids of the body and in the cytoplasm of the host cell for which antimony has some special affinity. As regards the cell deposits of an malarial malarial can be observed within them in the form of granules. While radiographically there is increased opacity of liver and spleen. An anemia which is such a prominent feature of kala-azar is due directly to the changes brought about by the parasites in the reticulo-endothelial system. There is hyperplasia of the histioid elements of this system and a proportionate hyperplasia of the haemocytoblast elements resulting in a kind of antagonism between the two. The leucocytes of the histioid series are increased while those of the haemocytoblast series are decreased. Other changes which occur in the blood are increase in the complement content, increased production of antibodies and diminished glutathione and cholesterol content.

The therapeutic effect of antimonial is due to the influence of these drugs on the cells of the reticulo-endothelial system which regain their normal function and are then able with the assistance of the antimony within them to destroy the parasites. In some cases where there is a concomitant malarial infection antimonial treatment eradicates both infections while certain quinine-resistant cases of malaria respond to antimonials. A similar explanation may account for the good effects of gold in the treatment of tuberculosis in which both the gold and the bacilli have special affinity for the reticulo-endothelial cells. Antimonial resistance is to be accounted for not by any peculiarity of the parasite but by a failure of the reticulo-endothelial system to respond to the drug as it does in most cases. Similarly the varying degrees of tolerance to the drug exhibited by different patients is to be attributed to variations in the same response.

C. M. Wenny

KORNETOV \ I. MIRLOVA \ A. [Treatment of Visceral Leishmaniasis with Solusurmin. *Med. Parasit. & Parasitic Dis.* Moscow 1942 \ 11 No 6 88-92. (In Russian.)]

The authors report the results of tests with solusurmin (analogous to solustibosan) in the treatment of visceral leishmaniasis of infants in Central Asia.

Preliminary tests have shown that 2.5 cc. of a 2 per cent solution per kgm. introduced intravenously into dogs produced no toxic symptoms. Solusurmin dissolves readily in water producing a clear solution which can be easily sterilized and will remain stable for a week even during the summer heat of Samarkand.

The full dose for human beings was 0.01 gm. per kgm. but at the beginning only $\frac{1}{3}$ - $\frac{1}{4}$ of this was injected, the doses gradually increasing until the full dose was reached in the fourth or sixth injection.

The minimum course consisted of 16 injections 30 being the average number usually administered intravenously every other day but sometimes daily

Of the seven children treated with this drug four were completely cured while in three the treatment was interrupted with the result that two relapsed but in one there was considerable improvement

In general solusurmin compared favourably with neostibosan though the number of injections required to effect a cure with the Russian preparation was considerably greater C A Hoare

THOMPSON R B Kala-Azar in an English Seaman *Lancet* 1944
Jan 1 17-18

The patient was a seaman aged 22 who had served in Malta where kala azar is said to be rife [this may be an exaggeration only 12 patients were admitted to the Central Hospital during 1937 for leishmaniasis] He was admitted to hospital in Newcastle and the disease was typical with double or triple temperature rise within 24 hours enlargement of spleen and liver anaemia with leucopenia and parasites present in the sternal marrow A course of tartar emetic failed to influence the condition but when a course of sodium antimony gluconate (identical with solustibosan) was instituted the temperature fell and he was shortly discharged apparently perfectly well

Charles Wilcocks

SEN GUPTA P C Observations on the Neuropathic Sequel of Diamidino Stilbene Therapy in Kala-Azar *Indian Med Ga* 1943
Nov v 78 No 11 537-43 18 figs

In earlier papers by NAPIER and SEN GUPTA [this *Bulletin* 1942 v 39 748 1943 v 40 121 1944 v 41 18] on the treatment of cases of kala azar by diamidino stilbene it was noted that though a cure rate of about 98 per cent was obtained there were two drawbacks The first was an immediate reaction of varying severity which though sometimes very alarming could be controlled by adrenaline the second was a delayed reaction of a neuropathic type of which seven cases were reported Since then 10 further cases of this sequel have come to light making a total of 17 cases amongst 104 treated with the drug The neuropathic symptoms confined almost entirely to the face first made their appearance three to four months after completion of the course of treatment There was no evidence that patients developing these symptoms had received more of the drug than the others nor that they were related in any way to the severity of the immediate reaction Analysis of the symptoms showed that the salient features were (1) subjective sensory disturbances paraesthesia and anaesthesia over parts of the area supplied by the trigeminal nerve (2) dissociated anaesthesia loss of sensation of light touch with preservation of sense of pressure pain and temperature over variable parts of the trigeminal area (3) absence of nerve lesions elsewhere It is concluded that the lesion in these cases is in the principal sensory nucleus of the fifth nerve in the pons It is probably a toxic degeneration and the syndrome may well be given the name suggested by NAPIER and SEN GUPTA in their original paper i.e. diamidino stilbene neuropathy As trichlorethylene inhalations may give rise to bilateral loss of sensation in the trigeminal area and have been employed to alleviate

symptom of trigeminal neuralgia it is suggested that it is the ethylene component of the drug under discussion which is the cause of the trouble. In a few cases there was extension of the symptoms to the neck while in a few there was loss of sensation to pain showing that the lesion might involve areas beyond the nucleus of the fifth nerve. The only treatment of cases with troublesome paraesthetic symptoms which gave results was injections of 1/100 000 solution of cobra venom in increasing dose. This produced some degree of subjective improvement. The condition is not dangerous to life and has a tendency to be recalcitrant.

C. M. Henyon

CHICKA B. L. *Oriental Sore and its Epidemics and Treatment* *Med Bull Bombay* 1943 Sept 4 & 11 No 17 319-20

During July and August 1942 the author observed 10 cases of oriental sore in Kasabganj a station five miles from Ferozepore. A cure was effected by the local injection of 2 cc of oriol (berberin sulphate solution) on one or more occasions.

C. M. Henyon

FEVERS OF THE TYPHUS GROUP

PFEFFEL G. & GALWERT F. *Günstige Wirkung von Rekonvalzeszentenblut auf den Verlauf des Fleckfiebers*. *Benefit from Convalescent Blood in Typhus Fever* *Illus Woch* 1943 July 24 & 22 No 30 31 481-4 1 chart

A detailed analysis is given of 50 cases in which convalescent blood was given during the first week in doses of 200 cc. The blood was collected 8 to 21 days after defervescence and was given intravenously. The results are contrasted with those of 100 control cases comparable in all other respects but 12 years older on the average.

The height of the temperature was not affected but the average duration of the fever was 1 day shorter in the treated patients and the fatality rate was 8 per cent against 12 per cent in the controls.

The symptoms associated with the nervous system were less severe in the treated patients and there were no septic complications whereas there were 8 cases of parotitis among the controls. No significant difference was observed in the complications referable to the respiratory system, the pulse rate, blood pressure or rash.

Of 9 patients who were transfused after the end of the first week, 5 died and of 6 transfused with healthy blood 2 died.

John H. D. Meade

ALWENS W. & FRANK H. R. *Beitrag zur Serumtherapie d. Fleckfiebers*. *A Note on the Serum Therapy of Typhus Fever* *Illus Woch* 1943 Oct 16 & 22 No 42 43 639-41 3 figs [16 refs]

The evidence supplied by the authors to support their conclusion consists chiefly of three temperature charts with a few notes on each. In the first case the temperature was 38.4 C on the morning of the third day and normal in the evening; on the fourth day it rose to 40 C. On the fifth day 40 cc of convalescent serum was given.

intravenously and the same dose was repeated on the fifth day. The temperature fell rapidly and became normal by the end of the sixth day. Nothing is said of the grounds on which the diagnosis of typhus fever was based. The other two cases resembled each other very closely: the temperature had exceeded 40 C [104 F] by the evening of the second day. Each of the patients was given one dose of serum on the second day and one on the third. The doses ranged from 90 to 120 cc. By the end of the third day the temperature had fallen; it remained almost normal till the seventh day in one case and till the ninth day in the other; then it rose again for two days with a return of the neurological symptoms. Each patient was given two further doses of serum and again the temperature fell to normal. From the 12th day in one case and the 14th day in the other there was low grade fever for two or three days but no serum was given.

In these two cases the diagnosis was based on a rising Weil Felix titre, the prompt response to serum treatment, the neurological symptoms, the total duration of illness, etc. No mention is made of a rash or of the titre of the reaction, but the course taken by the fever was regarded as being explained by the antitoxic action of the serum which twice controlled the fever but had no virucidal action.

In the summing up the authors state that their conclusions were reached after personal experience of the serum treatment in 22 of 48 cases but they give no details of these.

They claim that intravenous doses of 100 cc. convalescent serum given on the first or second day and repeated on the following day give immediate control of the fever and symptoms for five days or longer and that the recurring fever can be controlled by two further doses—up to a total of 500 cc. in all. After the third day the action of the serum is uncertain and after the fifth day no benefit can be expected.

[These results are much better than any that have been reported by other observers so it is tantalizing to be given such scrappy information about the clinical and other features on which the diagnosis was based. The reader must take the evidence on leave it.]

John W. D. Mega

RAETIG H. Kombinierte Fleckfieberbehandlung mit Rekonvalescentenserum und Eigenblut [Treatment of Typhus Fever by Convalescent Serum in Combination with Autohaemotherapy] *Klin Woch* 1943 Sept 4 v 22 No 36/37 560-63

The author claims good results in typhus fever from daily doses of 20 to 40 cc. of convalescent serum combined with daily doses of the patient's own blood given by the intramuscular route. In all suspected cases 40 cc. of the patient's blood are given at once and the dosage repeated daily for three or four days. In cases of moderate severity no further special treatment is needed but in all severe attacks the treatment is continued throughout the febrile period and convalescent serum is also given in daily doses of 20-40 cc. from the moment that the diagnosis is made.

[The personal impressions of the author constitute the chief evidence of the value of the treatment; the statistical results are not very convincing unless one is prepared to accept the author's argument that they

would have been much more favourable but for the high prevalence of complications and the adverse influence of climatic conditions.]

The patients taken into consideration include 300 admitted before the 10th day of the fever 100 other patients were treated but 91 were admitted after the 10th day and 9 had been inoculated against typhus.

The results are analysed in two groups the first consisted of 143 patients treated in the experimental stage of the investigation before the treatment was standardized the second consisted of 157 patients treated as described above.

I—Primary Group		Case	Percentage Fatal
No special treatment		81	17.4
Convalescent serum in small doses of various sizes		38	13.2
Convalescent serum 20 to 40 c daily through t		19	5.3
Patient's own blood 3 doses		5	0.0
Total		143	11.2
II—Treated Group			
No special treatment	(relatively mild cases)	70	0.0
Patient's own blood 3 doses	(more severe cases)	4	0.0
Combination of standard treatment		97	16.3
Total		157	9.6

John H. D. Meier

SPARROW H & MARESCHAL P. Innocence pour l'homme de la pique du pou typhique et donnees experimentales sur les conditions de l'infection typhique. *Harmlessness of the Bite of Lice Infected with Typhus*. *C R Acad Sc* 1942 215 No 17 389-91 Summary taken from *Rev Appl d Entom Ser B* 1943 Dec 31 Pt 12 234-5]

These experiments were carried out in view of doubts as to the ability of *Pediculus humanus* L. to transmit typhus by its bite. In the first series batches of 60-100 lice that had been infected 6-8 days previously by anal injection with murine or epidemic (house-borne) typhus were fed on 11 mental patients. In some cases the lice the feeding cages and the skin where the cages had been placed were disinfected with alcohol but in others this was omitted and the patients were encouraged to scratch the skin soiled with excreta after the cage was removed. No infection resulted though the excreta were shown to be rich in virulent rickettsiae. Most of the patients were subsequently shown to be susceptible to the strains to which they had been exposed as infection was obtained by placing on the forearm a drop of normal saline containing excreta or intestine from infected lice and scarifying the skin or by placing intestine or the dried or powdered excreta of infected lice on the conjunctiva.

KUMMERLING K. Wolhynisches Fieber (Fünftagesfieber Febris quintana) [Trench Fever] *Med Klin* 1943 June 25 v 39 No 25/26 451-4 [22 refs]

From this detailed description of trench fever it appears that no diagnostic test is yet available to the physician and that no drug has been shown to have any curative effect on the disease.

Isolation of the *Rickettsia* by feeding clean laboratory bred lice on the patient and even the *Rickettsia* agglutination reaction are practicable only in special laboratories. Also negative results with the agglutination test do not exclude the disease.

The chief clinical features are—(1) the fever curve when this shows short febrile paroxysms or waves of fever recurring periodically (2) severe neuralgic rheumatic pains especially the shin bone pains which occur in 70 per cent of the cases (3) enlargement of the spleen without signs of disease in other organs. Helpful points in diagnosis are the presence of louse infestation the known occurrence of the disease in the locality the rise in the leucocyte count during the febrile periods and the fall in the intervals and the exclusion of other diseases by cultural and other methods.

An important point is the risk attending the use of habit forming drugs in a prolonged disease of this kind. *John W D Megaw*

ECKARDT P. Zum Fünftagesfieber [Trench Fever] *Klin Woch* 1943 July 24 v 22 No 30/31 495

The author believes that the neurological manifestations of trench fever are due to localized myelitis affecting the posterior horns of the spinal cord. The pains in different parts of the body are associated with lesions of any of the segments between the third cervical and the first sacral. Zones of analgesia of the skin areas supplied by the corresponding nerves can often be detected they should be looked for in all cases of fever with a four to six day periodicity in which the classical shin bone pains do not occur but are replaced by any of the following symptoms (1) tachycardia and precordial pain (2) abdominal pains at night (3) recurring urinary colic and tenesmus of the bladder and (4) recurring spells of diarrhoea. *John W D Megaw*

PARFEE R K & KOHLS G M. American Q Fever the Occurrence of *Rickettsia diaporica* in *Amblyomma americanum* in Eastern Texas. *Pub Health Rep* Wash 1943 Oct 8 v 58 No 41 1510-11

R diaporica was demonstrated in 1937 in 10 of 92 batches of nymphal and adult *A americanus* from animals or from vegetation in Eastern Texas. The strains were passed through guinea-pigs which showed illness characteristic of that induced by the original strains isolated from *Dermacentor andersoni* in Montana. Some of the animals which recovered were tested and found to be immune to American Q fever but not to Rocky Mountain fever. Blood serum passed through a Berkefeld filter was infective one strain established in eggs exhibited the characteristics of *R diaporica*. *Charles Wilcocks*

YELLOW FEVER

LEWIS D J The Culicine Mosquitos of Eritrea. *B II Entom Res*
1943 Dec 1 34 Pt 4 279-80 1 fig (map)

The author made a two months tour during the dry season and records the Culicines collected at a large number of places from the coast to an altitude of 2480 metres. As his work is connected with problems of yellow fever he made a close search of domestic breeding places and found *Aedes aegypti* widely distributed up to about 1600 metres higher than that the species was consistently absent though domestic water containers were abundant. Many other domestic mosquitoes were found also several species which are known to be capable of carrying yellow fever.

The total number of Culicines known from Eritrea is 28

SWARTZ H Systemic Allergic Reaction induced by Yellow Fever Vaccine
J Lab & Clin Med 1943 Nov 1 28 No 14 1663-7

The record of a case of severe constitutional reaction to a single immunization injection of yellow fever vaccine

The patient a 27 year-old white man became acutely ill less than 30 minutes after receiving a single injection of cholera vaccine and one of yellow fever vaccine. He developed an anaphylactic oedema, urticaria, gastrointestinal symptoms and severe dyspnoea and in a short time lost consciousness. He regained consciousness after repeated subcutaneous injection of epinephrine. He was admitted to hospital and was discharged apparently recovered after six days but relapsed two days later and the symptoms continued with varying severity for some weeks.

The allergic reactions of this patient were studied and he was found to possess marked egg and fowl sensitivity. In view of the fact that the yellow fever vaccine was prepared from inoculated eggs containing developing embryos it was obviously the cause of the reaction to the injection.

The author is of the opinion that medical officers using vaccines should know something of the constitution of the immunizing injecton and the subject to whom it is given so that in cases of marked sensitivity to egg fowl meat or both the vaccine can be given carefully in divided doses with epinephrine at hand in the event of any severe reaction.

E Hundle

DENGLE AND SANDFLY FEVER

DANIELS W B & GRENNAN H A Pretibial Fever An Obscure
Disease J Amer Med Ass 1943 June 5 122 No 6 361-6

An outbreak of a decidedly unusual febrile illness occurred between July 29 and September 11 1942 among soldiers quartered in a well-defined populated area close to a stream near Fort Bragg North Carolina. The chief features of the 40 cases were as follows — The onset was sudden with fleeting coryza sore throat and cough.

in 30 per cent of the patients. The fever lasted two to eight days; there were spiky rises often two or three daily accompanied by chills. The spleen was palpable in 95 per cent of the cases. A rash was seen about the fourth day in all but five of the patients. In 60 per cent this was restricted to the pretibial areas; in 25 per cent there were also scattered spots on other parts of the body. The spots were slightly raised, erythematous and often were 2 to 3 cm in diameter. Brown staining persisted for about two weeks. Convalescence was rapid.

Leucopenia was pronounced in all but five of the cases about the third or fourth day. The lowest count was 2 600 per cmm; the highest 14 800. In 16 the count fell below 4 500 at some stage of the fever.

Blood and other materials taken from five patients between the second and fourth days were thoroughly investigated by a special commission of experts. Films, serum reactions, cultures (on ordinary media and yolk sacs) and animal inoculations in guinea-pigs, rats, monkeys and human beings all gave negative results.

A systematic search for possible vectors yielded no conclusive results. Sandflies and midges could not be found. Ticks were present but were regarded as unlikely to be vectors. *Culex* and *Aedes* mosquitoes were found but not *Aedes aegypti*.

Similar cases were described by BOWDOIN in Georgia in 1940 (*J Med Ass Georgia* 1942 v 31 437).

[Although the fever does not conform clinically to the dengue pattern and transmission by *Aedes aegypti* has been excluded, the failure to isolate a causal organism suggests a filter passing virus as the cause, and the conditions of occurrence suggest in analogy with Colorado tick fever [see this *Bulletin* 1941 v 38 694] and Bullis fever [*ibid* 1944 v 41 34]. The special conditions resulting from the war have brought to light a number of interesting, speculative short fevers, some of which are probably caused by a filter passing virus and are possibly members of the dengue group.] *John B. D. Megaw*

COHLN N. A. Pretibial Fever. [Correspondence.] *J Amer Med Ass* 1943 Dec 4 v 123 No 14 927.

The writer of this letter has had experience of several hundreds of cases of dengue in an area where dengue is hyperendemic. The clinical manifestations of the disease were no different from those described in the article mentioned [by DANIELS & GRENNAN above] with the exception of the predominance of the pretibial lesions. Such pretibial lesions, however, were not uncommon in this series although they were generally associated with similar lesions on the trunk.

The writer quotes from articles by several authors in support of his view that pretibial fever cannot be differentiated from dengue fever or (as some think) the group of fevers included in the term dengue. *J. F. Corson*

HALLIDAY J. H. & HORAN J. P. An Epidemic of Polyarthritides in the Northern Territory. *Med J Australia* 1943 Oct 9 v 2 No 15 293-5.

A series of 105 cases of a hitherto undescribed disease has been studied in two hospitals in the Northern Territory of Australia. The
(—4) C

patients were soldiers who were attacked near Darwin and at places about 150 miles south of this in the months of November and December 1942 and January 1943. Other cases had occurred previously.

The name acute polyarthritis is suggested for the disease. The onset was gradual with fever and painful swelling of the joints except in the mildest cases. The fever lasted two to five days, the temperature seldom exceeding 101 F and subsiding irregularly. The joints affected were chiefly those of the hands and feet; the swelling subsided after a week or so but pain on movement lasted three to four weeks. In some cases there was effusion for one to seven days; there were no after effects.

A discrete maculopapular rash was seen in most of the cases on the trunk and extremities but not on the face. It sometimes tended to be vesicular and to simulate varicella. It appeared on the second or third day. Groups of petechiae were sometimes seen on the soles of the feet.

The axillary, axillary and femoral glands were enlarged and tender in every case. Occasionally other glands were enlarged. The tenderness disappeared in three to four days and the swelling gradually subsided.

The leukocytes averaged 10,000 per cmm, the range being 5,000 to 15,000. Occasionally there was a moderate degree of neutrophilia.

Agglutination tests with *Proteus O\19*, *Proteus O\1*, and *Brucella abortus* were negative. Bacteriological investigations of fluid from the joints and of blood gave negative results. The tests included inoculations into rabbits, guinea-pigs, mice and developing hens' eggs.

Dengue was excluded by the pronounced differences in the clinical features, by the geographical distribution which extended farther south, and by the absence of *Aedes aegypti* from two camps in which a considerable number of cases occurred. The aetiology is unknown.

[This appears to be yet another of the short fevers that are cropping up in military camp in various parts of the world. Most of them seem to be more nearly related to dengue than to any of the other classical diseases. Information with regard to the epidemiology of this series of cases is scanty. The name acute polyarthritis is likely to suggest a more serious form of disease, especially as there was no swelling of the joints in mild attacks in the present series. *John W. D. Macdonald*]

[KELLY M. (*Med J Australia* 1943 Nov 27 451) suggests that the outbreak described above to some extent resembles Haverhill fever (*erythema irithriticum epidemicum*) though the onset was more gradual and the symptoms milder than in the latter disease. See *Bulletin of Hygiene* 1935 v 10 251.—Ed.]

GONTAeva A. A. [Sand Fly Fever and the Permeability Problem.] *Med Parasit & Parasitic Dis* Moscow 1943 v 12 No 1 64-9 [11 refs.] [In Russian.]

In the course of clinical observations on 154 cases of sandfly fever (which included 14 experimentally infected volunteers) the author's attention was drawn to the constancy of the exudative neurovascular syndrome. This led her to study the pathogenesis of the disease from the point of view of the permeability of the blood tissue barriers. The capillary filtration and the permeability of the vessel for protein were tested by Landis's method; the index of permeability with blisters,

was estimated according to Petersen and the endothelial symptom was observed according to Rumpel Leede Tests and estimates were also made of the blood volume by the haematocrit method of the amount of protein in the blood serum and its frictions as well as of the haemodynamic state (venous and arterial pressure circulation time etc)

Though the results obtained were not conclusive all the tests pointed definitely to an increase in the permeability of the blood tissue barriers This is also reflected in the clinical picture hyperaemia of the face neck and chest vascular changes in the throat and in the eyes and an intestinal syndrome simulating appendicitis The nervous symptoms in sandfly fever also appear to be due to increased permeability of the cerebral vessels (the blood brain barrier) while the higher pressure of the cerebrospinal fluid can also be attributed to the same cause

In general it would appear that the increased permeability of the blood tissue barriers represents one of the most characteristic changes in sandfly fever responsible for most of the clinical manifestations Conversely the period of convalescence can be regarded as the phase of gradual elimination of the surplus intracranial fluid C A Hoare

PLAGUE

BLAISE G & BALTAZARD M Recherches experimentales sur la peste
L infection de la puce de l'homme *Pulex irritans* L [Plague
Infection of *P irritans*] C R Acad Sci 1941 v 213 No 22
813-16 [Summary taken from Rev Applied Entom Ser B
1943 Dec v 31 Pt 12 234]

The usual methods of flea collection adopted in studies of the epidemiology of plague are such that rat fleas are collected and *Pulex irritans* L is not as it is generally assumed that the disease is transmitted from rats to man and not from one man to another In view however of the frequent occurrence of successive cases in individual families during an outbreak of plague in Morocco investigations were made on the possible importance of *P irritans* as a vector The fleas were collected in the following manner As soon as possible after a death from plague the corpse was stripped and removed All the clothes and coverings used by the deceased were left in the room and the door and all openings by which light could enter were sealed up After 4-5 days the door was opened and a large shallow white dish half filled with water was quickly placed in the shaft of light from it The hungry fleas were at once attracted to the white surface and fell into the water whence they were collected in glass tubes Batches ranging from 1 to 200 fleas were obtained and 29 strains of plague were isolated by injecting suspensions of them into guinea-pigs or rats In all the cases that gave positive results the animals died of plague 3-7 days later Infection was similarly demonstrated in a batch of about 200 fresh fleas that had been allowed to feed on a patient dying of plague It was shown to persist for 21 days in living fleas from houses of persons who had died of plague and for five days in dead fleas or

in the excreta of fleas under natural conditions. A mouse was successfully infected by placing a few drops of diluted excreta on the mucous membrane in the mouth. Finally three guinea pigs in succession were successfully infected by the feeding of a mixed batch of several hundred fleas from the houses of dead persons.

BAILLARY DYSENTERY

BOVAIN V J & KAY H B Dysenteric Arthritis. Case Reports and Comments. *Med J Australa* 1943 Nov 6 v 2 No 19 380-82

The chief interest of this paper is not so much the record of five cases of dysenteric arthritis as the recognition of this condition in what other wise would have been considered and treated as traumatic synovitis. The association appeared doubtful from the history but in four instances *Bacterium dysenteriae* Flexner was recovered on culture by means of sigmoidoscopic swab and it was isolated from the faeces in the fifth. In each case a history was obtained of an attack of acute diarrhoea some time (8 months, 6 weeks, 4 months, 3½ months and 2 weeks) previous to the onset of synovitis. In three of the patients the joint affection followed trauma, in two no history of trauma was obtained but sigmoidoscopy revealed a granular proctitis from which the dysentery bacillus was isolated.

In four of the cases the knee was affected, in the fifth the ankle and second toe.

The results of treatment with sulphaguanidine were very favourable with large doses (120-176 gm) being given in a single course. It is probable that in one instance at least a diagnosis of traumatic synovitis had delayed correct treatment for months.

The features common to these cases were fairly sudden onset of mild aching pain increasing at night with moderate synovial effusion and raised joint temperature. Emphasis is laid upon the absence of local tenderness, pain on movement and periarticular swelling. The effusion and aching persisted in spite of rest.

In the Northern Territory of Australia and other areas where dysentery is prevalent any patient with arthritis of the type described should be investigated from this point of view. P. Manson Bah

GARD J J The Sulpha-guanidine Treatment of Shiga Dysentery in New Guinea. *Med J Australa* 1943 Sept 4 v 2 No 10 188-90

The author makes an interesting point in this paper. Although many patients suffering from dysentery were admitted to hospital during the campaign in New Guinea it was not until the closing stages that Shiga infections were seen. Since this type of dysentery is common in Japan it is possible that the enemy was the source of infection especially as the majority of these patients admitted to the Australian General Hospital had been in close contact with and had occupied ground fouled by the Japanese. If this is the correct explanation it is reasonable to expect a high rate of Shiga infections in all campaigns against the Japanese especially when the enemy is in retreat.

Treatment consisted of an initial dose of 2-4 drachms of sodium sulphate followed two hours later by 7 gm of sulphaguanidine. Thereafter 3.5 gm of sulphaguanidine were given every four hours from 6 a.m. to 10 p.m. This treatment was continued until the number of stools *per diem* was 5 or less when the dosage was reduced to 3.5 gm three times a day. When the number of stools had been normal for 2-3 days the drug was discontinued.

The results in the 25 patients so treated were good. The average dose of sulphaguanidine required for cure was 1.2 gm. no toxic effects were seen. stools became normal in an average of 11.5 days. there were no deaths. Antitoxic serum was not used nor was it needed. The author advocates that treatment with sulphaguanidine be instituted as early as possible before large areas of mucosa have been destroyed.

Charles H. Alcock

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

AYRES W. W. Observations on the Growth of *Entamoeba histolytica* in Media containing Sulfathiazole. Preliminary Report. *U.S. Nav. Med. Bull.* 1943 May v 41 No 3 714-16

The author has studied the effect of sulphathiazole on cultures of *Entamoeba histolytica* in Craig's Locke serum starch medium. The drug when added to the medium to give a strength of 60 mgm per cent did not appear to be toxic to the amoebae. In some cases the growth of the amoebae was improved by the addition of the drug presumably through the control of certain injurious bacteria. One strain was stimulated by the addition of *Bact. coli*. During the experiments it was observed that amoebae replete with red blood corpuscles discharged these from the posterior end when in motion. The author states that his preliminary results indicate that further experiments along these lines are worth conducting.

C. M. Henyon

JACKMAN R. J. & COOPER W. L. Value of Proctoscopy in the Diagnosis of Amebiasis. *Amer. J. Digestive Dis.* 1943 Oct v 10 No 10 365-6

The value of proctoscopy in the diagnosis of amoebic dysentery is considered by many as controversial. In a study of 115 patients all of whom had sufficient intestinal symptoms to warrant microscopic examination of the stools, ulceration of the lower part of the bowel was found in 20.8 per cent typical or suggestive of amoebic ulceration. For this relatively low percentage of active and visible ulceration it is explained that the type of amoebiasis observed at the Mayo Clinic differs somewhat from that in other sections of the United States in that the condition has usually been of longstanding and subjected to previous treatment.

With regard to the location of the ulcers there did not seem to be any predilection for the edges of the valves. In 17 per cent repeated faeces examination gave negative results but scrapings from rectal ulceration in one and biopsy of an ulcer in a second afforded the means of demonstrating *Entamoeba histolytica*. A definite statement is permissible that given a patient suspected of amoebiasis and whose

faeces after repeated examinations have given negative results direct proctoscopic examination should be undertaken with the idea of obtaining positive evidence.

To the senior author who had previously pointed out the relative frequency with which anal abscesses occurred in chronic ulcerative colitis and regional ileitis it was surprising that only one out of this series had an ischio-anal abscess and one an anal fistula. This figure 1.7 per cent contrasts with 30 per cent in regional ileitis and 8.4 per cent in chronic ulcerative colitis.

One case of amoebic granuloma which is so liable to be confused with malignant disease was seen. The differential diagnosis was established by biopsy and demonstration of amoebae in the faeces. This latter finding cannot by itself be taken as sufficient to exclude malignant growth for one of the patients with amoebiasis was found subsequently to have a coexisting carcinoma in the lower sigmoid demonstrable solely by proctoscopy.

Two patients were found to have single sessile polypi in the sigmoid which possibly might be regarded as pseudopolypi analogous to those of chronic ulcerative colitis. Rectal stricture was found once in a longstanding amoebic infection it did not resolve after intensive treatment.

P. Manson Bahr

IVANISSEVICH O. TAIANA J. A. NIÑO F. & ROSITO E. Amibiiasis hepato-pleuropulmonar [Hepato-pulmonary Amoebiasis] *Bol. Int. Clin. Q.* 1:1 Buenos Aires 1943 Jul-Aug. v. 19 No 159 399-404 5 lines English summary

A fairly straightforward case in an Argentinian 20 years of age. He had suffered for two months with pain in the right shoulder and right side of the chest and had lost 10 kilos in weight. He was pallid and cyanosed with subicteric tint and was expectorating chocolate-coloured matter in which trophozoites of *E. histolytica* were found. On the day after his admission 400 cc of reddish turbid fluid were removed by thoracentesis through the eighth right intercostal space and three days later another 150 cc and 50 cc more after another week. The temperature having been normal after the second aspiration the patient left hospital but returned in a fortnight as his general state was deteriorating. He was expectorating 250 cc of thick yellowish sputum daily. The blood showed little abnormal: red cell 4,640,000 white cells 8,900 per cmm. Hb 85 per cent. CI 0.9 neutrophils 49 eosinophils 16 monocytes 17 lymphocytes 18 per cent. Hydatid was ruled out at least no positive evidence of it except possibly the sputum. A course of emetine was started and two days later the entamoeba was found in the sputum. He had two courses of emetine with an interval of 50 days between them during which he had 0.5 gm of amobarbital daily for five days. Symptomatic treatment comprised cardiac tonics blood transfusion no reason is given for these; calcium hypertonic glucose intravenously ascorbic acid thiamin and iron. Apparently all went well but nothing is said about further progress. [In the detailed history the authors make no mention of any preceding attack of dysentery though they deem it important enough to note that the patient's father had had a hemiplegia that he himself smokes a packet of cigarettes daily and his habit includes moderate ethylism a very nice euphemism.]

H. Harold Scott

KARLEN M A Un nuevo caso de tumor inflamatorio amibiano de Lasnier [A New Case of Lasnier Amoebic Granuloma] *Arch Uruguayos de Med Cirug y Especialidades* 1943 July v 23 No 1 63-72 4 figs

The case reported is that of a woman 54 years of age who with a previous history of hysterectomy for fibroids developed a painful tumour in the right iliac region. A laparotomy was performed and it was found that the tumour was produced by a thickening of the caecum and lower part of the ascending colon. As it did not seem possible to interfere the wound was closed and healing occurred normally. The nature of the tumour having given rise to a suspicion of amoebic infection careful faecal examinations were instituted. Eventually after saline purges undoubted amoebae with included red blood corpuscles were discovered. Emetine and carbarsone were administered but these drugs did not prevent the development of an abscess in the region of the caecum. This was opened and drained amoebae with included red blood corpuscles being found in the pus. Complete healing occurred in 23 days this being accompanied by a return of normal health and general improvement in the condition of the blood which at the commencement had revealed a marked anaemia and leucocytosis. The patient had no return of symptoms and a radiological examination conducted five months after the operation showed that the caecum and colon were functioning normally.

C M Wenvon

HEILIG R & VISVESWAR S K On the Cardiac Effects of Emetine *Indian Med Ga* 1943 Sept v 78 No 9 419-24 8 figs on 1 pl. [18 refs]

This is an important paper. There is no agreement upon the frequency and extent of untoward cardiac by effects of emetine or upon the best method of administering this drug. This is unquestionably of practical importance because if general opinion that emetine should not be given if heart lesions exist were justified it would be difficult to find a case where it could safely be used. Most of the authors' cases of amoebic dysentery showed some signs of myocardial damage due to coexistent ankylostomiasis. Difference of opinion manifestly exists on the best way of administering emetine. Most authorities have ruled that the intravenous route is dangerous though MUHLENS always preferred this method to any other.

Material has been collected with reference to two main questions: (1) whether emetine intramuscularly in therapeutic doses causes cardiac damage so frequently that special care is necessary or whether it is absolutely contraindicated if some cardiac lesion is present; (2) whether there is any significant difference between the by effects of intramuscular and intravenous administration in man.

Forty-five unselected patients (10 of them women) with acute amoebic dysentery received twelve emetine injections—one grain *per diem*—the course consisting of two series of six injections with one day's interval. To 14 emetine was given intramuscularly and electrocardiograms were taken before the first, after the sixth and after the twelfth injection. At the same time orthodiagrams were traced and blood pressure estimated. Thirty-one patients (6 females) received the same amounts of emetine with the same spacing intravenously. In 16 of these electrocardiograms were taken and blood pressure estimated before and at various intervals (up to one hour) after the

first and second sixth or twelfth emetine injections in the remaining 15 the same procedure was adopted with orthodiagrams in addition before the first and after the sixth and twelfth grain of emetine. In most of the cases electrocardiograms were traced at all three stages of the emetine course before and after exertion (which consisted in climbing thrice up and down 29 steps at maximum speed).

Out of 14 patients treated with intramuscular emetine no less than 11 had a pathological electrocardiogram before treatment was initiated these pathological findings consisted in low voltage flat T waves or rarely in a depressed S-T. During treatment of three normal cases one was uninfluenced one developed a slightly higher P, T₁ and T₂ as the course progressed and one became worse as far as the cardiogram was concerned.

The following cardiographic changes accompanied intramuscular emetine. Some improvement was obtained in 11 out of 14, no change in 2, some deterioration in 1 initially normal case.

After intravenous emetine injections the cardiographic changes showed a wider range of variation. In none of the 31 of whom only 8 had a normal cardiogram did any irregularity of the heart rhythm appear, no extra systoles, no block, no auricular fibrillation.

Sixteen patients were tested in short range experiment, i.e. cardiograms taken before the first intravenous injection of one grain of emetine and 5, 15, 30 and 60 minutes afterward or before and 15 minutes after the first second sixth or twelfth intravenous emetine injection. Amongst these four had a normal electrocardiogram when treatment commenced but within one hour all four showed some deterioration under influence of emetine. Out of five women all of whom presented some pathological electrocardiographic lesions on admission four remained unaltered after emetine. The total result in these 16 cases was that in the course of intravenous medication no definite changes were noted in 10. While in the other six the following alterations occurred: a prolongation of P-Q (delayed conduction) was seen twice, the voltage of R in one or more leads was diminished in three and the T waves in one or more leads were flattened in 5. The two cases of delayed conduction occurred after the first injection in patients with previously normal electrocardiograms. Blood pressure changes were noted as early as 10-15 minutes after the first intravenous injection both systolic and diastolic readings being diminished by 5-10 mm Hg.

On the other hand patients showing considerable myocardial lesions prior to emetine medication did not suffer any deterioration after the first and sixth injection. In the last group comprising 1 cases the same investigations were repeated under the influence of exertion. An electrocardiogram was taken and blood pressure estimated before and immediately after exercise as previously before the first after the sixth and after the twelfth intravenous emetine injection so as to detect functional changes which might escape notice if patient remained at rest. These resulted in a diminished height voltage of R in six, an increased voltage in one and a lowering of T in one or more leads in nine. In five cases the height of the T waves increased after six injections. Thus no change occurred in one, some deterioration in nine and some improvement in five. None of the myocardial lesions which appeared during treatment was brought to light by the exertion test, all of them were already manifest at rest and were merely accentuated by exertion.

There appears to be no divergence of opinion about the cardiac action of emetine in experimental animals—an overdose causing ventricular fibrillation in rabbits

BROWN of the Mayo Clinic [this *Bulletin* 1936 v 33 542] doubts whether untoward cardiovascular reactions are frequently seen in man as none had occurred in 554 cases of amoebiasis in 15 years clinical experience and the author's experiments seem to prove that 12 grain courses of emetine by the intramuscular route have no damaging effect on the myocardium even if some myocardial defect exists at the commencement of the medication. The only patient who suffered some deterioration was the only one whose dysentery did not respond promptly to the treatment. The explanation of these observations seems to be that the positive effect upon the heart exerted by improvement of the intestinal and general condition under emetine prevailed over a possible negative emetine effect on the heart muscle.

On the other hand the results of intravenous emetine administration confirmed the fact that by exceeding a certain emetine concentration either in a single dose or by cumulative action signs of a myocardial lesion could be produced.

The pulse rate remained constant in the immediate (short range) experiments and during the emetine course varied mostly according to the cardiographic changes. The behaviour of the blood pressure cannot be taken as an indication of a toxic emetine effect on the heart muscle provided that the electrocardiogram is regarded as a reliable mirror of the myocardial condition.

Changes of the size and shape of the heart such as are to be seen in carefully traced orthodiagrams were negligible in the course of intramuscular or intravenous emetine administrations.

[This paper is illustrated by reproduction of electrocardiograms to which reference is made in the text. Unfortunately they are so reduced that it becomes impossible to follow the changes in the waves described in this paper and they are therefore useless for future reference.]

P. Manson Bahr

INDIAN MED GAZ 1943 Sept v 78 No 9 443-5 The Toxicity of Emetine

The only real indication for the use of emetine is clinical evidence supported by laboratory findings of infection with *Entamoeba histolytica*. In spite of the fact that it is generally conceded that much if not most dysentery is not amoebic it frequently happens that emetine is given empirically and it is also frequently the case that faeces examinations are performed by inexperienced laboratory workers. From the clinical aspect there can be no doubt that emetine is a toxic drug with a cumulative action and on that account the dosage and period of administration have to be controlled. It is hoped that the days of excessive doses have gone.

NAPIER [in a book on Tropical Medicine in the press] has expressed his conviction that the most disastrous consequences may result from the ill advised administration of emetine. During the 1914-1918 war the writer saw many examples of inexperienced medical officers giving two and even three grains of emetine daily for long periods and literally killing their patients of whose fate they were often quite unaware on account of the frequent evacuations from hospital that are inevitable in war time.

The most dangerous and important effect is on the heart in which it produces myocardial degenerative changes and alterations in conductivity with a fall of blood pressure cardiac irregularity and acute dilatation as the result of any undue effort.

At present the dose of emetine is limited to 1 grain a day and the days of long continued administration for several weeks have now it is hoped also gone. The course now usually consists of not more than 12 injections often 9 or even 6.

Are the limited doses for limited periods toxic? Most of the evidence on this point is based on experimental work on animals. SOLLMANN (*A Manual of Pharmacology and its Application to Therapeutics and Toxicology* 1942 Saunders Philadelphia) stated that the effective dosage of emetine seriously overlaps the toxic range (LEAKE 1933) indeed toxic phenomena occurred from effective treatment in 80 per cent of the monkeys used (DOBELL and BISHOP 1929). Excessive use is followed by accentuation or recurrence of diarrhoea sometimes by nausea peripheral palmar oedema from renal damage weakness and irregularity of the heart.

Emetine hydrochloride is toxic for most animals including man with 10 to 35 m per kg hypodermically (Leake 1932).

The subcutaneous therapeutic dose of 1 grain is in a 10 stone man 1 mgm per kilo and is well within the limits of safety from toxic effect.

A special study of the matter was undertaken by BROWN [this Bulletin 1936 v 33 347] in the Mayo Clinic in 23 most commonly peripheral neuritis and recorded toxic effects in 23 cases with emetine hydrochloride. He also stated that he had traced 37 reported cases of toxic effects produced by emetine and that 10 deaths had been reported.

Thus it may be taken that the ordinary therapeutic course of emetine is accompanied by a certain amount of risk or toxic effects but that the risk is not a very serious one provided that certain precautions are taken. Most authorities recommend that during the period of emetine administration the patient should be kept in bed and that exertion should be reduced to a minimum.

SOLLMANN (*loc cit*) states. Local and gastro-intestinal effects are relatively mild or absent with hypodermic injections of the ordinary therapeutic doses of emetine hydrochloride. Larger doses produce some nausea vomiting depression and pain. Even 0.5 gm in a single dose caused only persistent nausea (ALLAN). Cephaeline is more emetic. If emetine solution should accidentally touch the conjunctiva it is very irritant (BLUE 1915). Bloody diarrhoea in consequence of therapeutic hypodermic emetine injection is probably more common than was formerly supposed. It may be mistaken for recrudescence of the dysentery.

There seems to be considerable unanimity of opinion except in the matter of the heart affection. There appears to be no difference of opinion regarding the fact that emetine administration may cause some disorder of the heart's action mainly a tachycardia. Some have attributed this to actual myocardial damage others have suggested that it is due more to vagus irritation than to myocardial affection.

The paper by HEILIG and VISWESWAR (see above) is interesting and no doubt accurate. It is however in marked contrast to the reports of other workers. The authors suggest that the lack of toxic effects may have been due to the absence of cephaeline in the preparation they employed but it may be taken that all good brands of emetine are free from cephaeline.

P. Manson Bahr

GHOSH B N & ADHVA P C Some Newer Observations on the Pharmacology of Emetine *J Indian Med Ass* 1943 Nov 13 No 2 37-40 7 figs [13 refs]

1 Emetine hydrochloride depresses the heart the auricles being more depressed than the ventricles The effect is on the musculature and not on the nervous mechanism

2 It produces a fall in blood pressure due to the depressant effect on the heart Direct action on the vessel wall appears improbable The central depression might partially contribute to the fall in pressure

3 Therapeutic doses produce slight stimulation of the intestinal movements and also slight congestion of the intestines Large doses depress intestinal musculature

4 It does not directly stimulate the vomiting centre in the medulla

5 It has no effect on the uterus and therefore it is not likely to induce abortion as has been generally believed

RAVELO BAPTE M & THOMAS L F Incidence of Protozoan Parasites of the Human Intestine in the District of Santo Domingo Dominican Republic *Amer J Trop Med* 1943 Mar 23 No 2 243-6 1 graph

In the national laboratory of Santo Domingo 500 faecal specimens submitted for examination for helminthic ova or larvae were also studied from the point of view of protozoal infections Though in some cases the specimens were too old for satisfactory examination for protozoa 52.2 per cent were positive The incidence of *E histolytica* was 14 per cent that of *E coli* 34.3 and of *E nana* 18.2 The somewhat remarkable claim is made that all the *E histolytica* infections were of the small race and that though a search for the large race was made none was found

C M Henyon

WESELMANN H Ueber die Bedeutung des Vorkommens von Lamblien im Duodenum und im Gallenwegssystem [The Presence of Giardia in the Duodenum and in the Gall Bladder] *Dent Militarar t* 1943 Apr 18 No 4 204-7

Illustrating his remarks by reference to two cases of Giardia infection the author advises that in all cases of long standing and refractory gastroenteritis examination for these parasites should be carried out by duodenal tubage The two patients mentioned had suffered for many months from distressing abdominal symptoms which no form of treatment was able to relieve Finally a diagnosis of Giardia infection was made Elimination of the infection by means of acranil was followed by recovery The author states that in some cases symptoms referable to the gall bladder occur though he admits that only in very rare cases has the presence of Giardia in this organ been recorded Failure to exclude a Giardia infection has often resulted in surgical interference with the gall bladder without removal of the primary seat of infection [Acranil formerly called Sostol is a hydrochlorate of an acridinic compound See also DE MURO this *Bulletin* 1940 37 378 and GOTT *ibid* 379]

C M Henyon

RUIZ SANCHEZ F Flagelado intestinales en Guadalajara [Intestinal Flagellates in Guadalajara Mexico] *Medicina Mexico* 1943 Aug 10 v 24 No 441 312-23

In a hotel in Guadalajara Mexico occupied by young refugees from 5 to 17 years of age chiefly from the Pacific Coast the author carried out a survey for intestinal flagellate infections which were determined by the microscopic examination of faecal specimens obtained after a saline purge. In all 380 persons were examined the results in four age groups are as follows—

Age	Examined	Infected	Trichomonas	Giardia	Chilomastix
5	0	17	50	25	10
6-9	16	83	1	34	1
10-13	154	40	136	104	19
14-17	44	10	159	45	23

This high incidence suggests that the sanitary arrangements in the hostel are in need of revision

C M Henson

KIRBY H Observations on a Trichomonad from the Intestine of Man [Research Notes] *J Parasitology* 1943 Dec v 29 No 6 422-3 1 fig

The author remarks that there is a growing tendency to regard all the trichomonads found in the intestine of man as belonging to one species which has a variable number of flagella. The name for this species is according to some observers *Pentatrichomonas hominis* (Davaine) and according to others *Trichomonas hominis* Davaine. The author has studied in culture a five-flagellated trichomonad isolated from the human intestine and has come to the conclusion that the arrangement of the five flagella justifies the view that this form is a species distinct from others found in the human intestine and that the name *Pentatrichomonas hominis* (Davaine) can reasonably be retained for it though he admits that we can never know what was the actual structure of Davaine's flagellate. The distinguishing features of the form studied by the author are the origin of four of the anterior flagella from an anteriorly directed column 1 to 2 μ in length and the independent origin of a short fifth flagellum from a point about 1/2 posterior to the root of the column on the side of the body opposite to that on which the undulating membrane begins. It is considered that the arrangement of the independent flagellum is a new feature in the organization of these flagellates and that a distinct generic name is called for

C M Henson

SCOPER H W Pathogenicity of Intestinal Protozoa. *Amer J Digestive Dis* 1943 Oct v 10 No 10 366-8 3 figs

The author maintains that various intestinal protozoa usually regarded as non-pathogenic are actually able to cause intestinal derangement particularly of the lower part of the small intestine. Certain forms of ileitis are said to be the result of trichomonas infection which is only detectable during the acute phase of the complaint. Stovarsol treatment is spoken of as an almost infallible remedy for all these infections except that due to *Giardia* which responds readily to

atebrin. It must be admitted that the evidence in favour of pathogenicity of *Eutamoeba coli*, trichomonas and chilomastix is far from convincing.
C M Wesson

RELAPSING FEVER AND OTHER SPIROCHAETOSIS

GREIG E D W. An Epidemic of Relapsing Fever in Edinburgh in 1843. *Edinburgh Med J* 1943 v 50 No 11 681-6 [11 refs]

The author recalls the epidemic which led CRAIGIE to name the disease relapsing fever and from contemporary accounts has compiled a description of the clinical details. One point in the epidemiology is particularly interesting namely that it was noted that laundry women were frequently infected after washing the clothes of the patients.

Greig points out that war and post war conditions are particularly favourable to the spread of louse borne diseases and notes that relapsing fever as well as typhus was very prevalent in the Balkans and Eastern Europe in the war of 1914-18.
Charles H Nicolson

SERCENT A & RICHARD H. *Spirochaeta hispanica* peut persister plus de deux ans dans le cerveau d'un cobaye inoculé expérimentalement [*Spirochaeta hispanica* can persist for more than Two Years in the Brain of a Guinea pig Inoculated Experimentally] *Arch Inst Pasteur d Algérie* 1942 Dec v 20 No 4 293-7 1 chart

An account of experiments performed in 1936 on the persistence of latent infections of *S. hispanica* in the brains of guinea pigs after clinical recovery.

The guinea pigs were infected with an Algerian strain of *S. hispanica* maintained either in *Ornithodoros* or *Rhipicephalus* and were killed at various intervals after apparent recovery ranging from four months up to two years. The guinea pigs were killed by total bleeding and the brain removed and carefully washed in saline in order to get rid of any traces of blood. Then each brain was emulsified in 10 cc of saline and inoculated into normal guinea pigs.

The results indicate considerable individual variation in the persistence of latent infections in some cases these had disappeared within four months of infection but in others residual brain infections were found in guinea pigs more than two years after the original attack.

The incubation period of the infections produced by the inoculation of brain tissue was found to be longer (average 8½ days) than when spirochaetes from an acute attack were used (average three days) the resultant attacks however were of similar duration with both sources of infection.
E Hindle

CHORINE V, CRABAR P, TIXIER R & CROUGUE O. Ultrafiltration de *Spirochaeta hispanica*. Détermination des diamètres des formes visibles et des formes invisibles. [The Ultra Filtration of *Spirochaeta hispanica*. Determination of the Diameter of the Visible Forms and of the Invisible Forms] *Ann Inst Pasteur* 1943 May-June v 69 Nos 5-6 162-70 1 chart [11 refs]

A record of filtration experiments with *S. hispanica* using collodion filters [see HINDLE and ILFORD this *Bulletin* 1933 v 30 723] in

order to determine whether there was any difference in the filterability of the so-called invisible stage of the spirochaete and the ordinary spiral form.

The authors used guinea pigs infected with *S. hispanica* by the bites of *Ornithodoros erraticus*. The plasma of the infected animals was diluted 1:10 in Tyrode's solution without calcium salts and containing 1.5 per cent sodium citrate. The suspension was passed through collodion membranes with porosities of 500 ± 70 mu filtered under a pressure of 1.4 atmosphere. To test adsorption the filtrate of a rich suspension of spirochaetes was collected in 10 successive fractions of 2 to 6 cc and each examined to see how many organisms it contained. The results are given in the form of a curve and show that with adsorption in the membrane and it as only the 20th to 25th cc of the filtrate that gave a concentration equal to the original suspension. The number of spirochaetes in the blood of guinea pigs at different stages of the infection is known to vary enormously and blood as collected and filtered not only during the intervals between febrile attacks but also during the attacks when spirochaetes are very numerous but also during the intervals between the attacks when it is usually impossible to detect them by microscopic examination. The filtrates were examined both microscopically and also tested for infectivity by inoculation into normal guinea pigs.

The filtrates were examined both microscopically and also tested for infectivity by inoculation into normal guinea pigs. The results show that the typical spiral form of *S. hispanica* stopped by membranes with an average porosity of 424 ± 22 mu but passed through a membrane of 500 ± 100 mu porosity which indicates a diameter of about 210 to 250 mu.

The invisible forms collected during the intervals between febrile attacks were also stopped by membranes of 444 ± 22 mu porosity and passed through those of 541 ± 28 mu porosity. Their diameter therefore could be approximately the same as the ordinary spirochaetal form named 10 to 100 mu but the author remarks that the invisible forms seemed to pass through the membrane with rather more difficulty than the typical spiral forms. As a result it is evident that the failure to detect spirochaetes in the blood during these negative though infective phases cannot be explained by the presence of very slender forms. Either the infective organisms are more or less typical spirochaetes so far as to escape detection or are much shorter than the typical form and consequently resemble the granules generally present in serum.

E. Hindle

ROBINSON, G. G. The Use of a Plaster Substratum for testing Pyrethrum Oil Films against *Ornithodoros moubata* Murray (Acarina Argasidae). Bull. Ent. m. Res. 1943 Dec 34 Pt 4 269-77 4 figs.

A solution of pyrethrum in oil is an effective insecticide for use against *Ornithodoros moubata* the vector of relapsing fever in Central Africa. In addition to killing by direct contact spraying with this liquid leaves a film toxic to ticks which subsequently walk over it. In a laboratory investigation the efficiency of films produced by solutions of various compositions plaster model were prepared and ticks put on them after they had been sprayed. In Africa the ticks normally infest the huts of natives and the model was used as an approximation to the dried mud of the floor or walls.

Solutions of 0.2 to 0.4 per cent Pyrethrin I [? about 0.4 to 0.8 per cent total pyrethrins] were used with deposits of 0.3 to 2 mgm per sq cm. A partial or complete mortality was obtained after the ticks had been on the treated surfaces for four days at 28 C and 50 per cent relative humidity. The insecticide was most effective if applied —

- 1 Concentrated rather than dilute
- 2 In a medium rather than a light petroleum oil
- 3 As an emulsion in Lanette Wax solution rather than in oil alone
- 4 With an irritant (such as 4-chloro-2-methyl phenol) present in the solution

J R Busvine

LOURIE E M & COLLIER H O J The Therapeutic Action of Penicillin on *Spirochaeta recurrentis* and *Spirillum minus* in Mice *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 200-205

A record of experiments on the effect of penicillin on infections of *Spirochaeta recurrentis* and *Spirillum minus* in mice

When mice infected with *S. recurrentis* were injected each with a single dose of 250 units of the calcium salt subcutaneously or with five doses of 50 units at hourly intervals the spirochaetes usually disappeared from the blood within 24 hours. Neoursphenamine in doses of 1 mgm subcutaneously produced the same result. In most cases however the parasites reappeared within a month no matter which drug was used for treatment [Recent work by MAHONEY, ARNOLD and HARRIS (*Amer J Pub Health* 1943 v 33 1387) indicates that penicillin treatment may be most valuable in syphilis]

In the case of infections of *Spirillum minus* in mice doses of 10 units of the calcium salt of penicillin administered subcutaneously (1/650 of the tolerated dose of the sodium salt) caused the disappearance of the parasites from the blood within 24 hours whilst in the case of neoursphenamine 1/2 to 1/4 of the tolerated dose was required to produce the same effect. Further experiments showed that penicillin was much more efficient when given in a series of fractional doses than in a single injection. Mice were cured by an aggregate of 100 units by the former method but 1 000 units were required when given in one dose.

Penicillin had no action against infections of mice with *Trypanosoma rhodesiense*, *T. congolense* or *T. cruzi* or on *Plasmodium relictum* infection in canaries.

The potential superiority of penicillin over neoursphenamine in the treatment of these spirochaetoses raises the question as to whether this drug may not be effective against syphilis. [An editorial note in *J Amer Med Ass* 1944 v 124 99 states that HEILMAN and HERRELL have obtained good results with penicillin (1 000 units) in mice infected with *Sp. novyi*. Of 26 treated mice only 1 died but in the control group 21 of 27 died. Only 4 of the surviving treated mice had relapses. No reference to a published account of this work is given.]

E Hindle

SYMONDS J W C A Case of Rat Bite Fever *J Roy Army Med Corps* 1943 Dec v 81 No 6 288-90

The record of a case of rat bite fever in a professional rat catcher who carried out this work in a military hospital and had been bitten about a dozen times without any untoward result. However 14 days

after a recent but he was admitted to hospital with fever and an inflamed indurated swelling at the site of the wound. During the next few days his temperature rose to 103 F and then the symptoms and signs abated. The only treatment given was sulphamamide by mouth and local applications of heat to the wound.

The fourth day after admission the enlarged axillary gland was aspirated and the culture of the fluid obtained grew *Streptobacillus moniliformis*. This organism has only occasionally been isolated from human cases of rat bite fever in Britain although it is a common inhabitant of the nasopharynx of both laboratory and wild rats. The clinical symptom produced seem to be indistinguishable from those following infection with *Spirillum minus* and the possibility of its occurrence must be borne in mind in cases of rat bite fever (see also this Bulletin 1942 39 693) E Hindle

MOESCHLIN S. Lung infiltrate beim Ikterus infectiosus Weil
[Lung Infiltration in Weil's Disease] *Schweizer med Woch*
1943 Oct 27 73 No 40 1227-30 2 figs [16 refs]

An account of three cases of Weil's disease showing infiltration of the lungs which is considered to be a specific inflammatory process of the lung.

There is a noticeable contrast between the slight physical signs of the process and the side shadows shown in the X ray photographs. In all three cases the symptoms appeared at the beginning of the second febrile attack and one of these patients developed a typical relapse. Spirochaetes however were not found in the sputum and none of the cases showed a haemorrhagic diathesis.

In another fatal case the autopsy showed severe dissociation of the liver cell and parenchymatous haemorrhages in the lungs which could be the cause of the shadows seen in the X ray photographs of the thorax. These haemorrhages are considered to be probably the result of a lack of prothrombin. The author obtained good results in the treatment of the disease with convalescent blood plasma and the transfusion of 400 cc produced great improvement within 24 hours. E Hindle

DE WYTT W H H J. The Diagnosis and Treatment of Yaws among West African Troops. *J. R. Army Med Corps* 1943 Dec 1 51 No 6 255-67

A study of 7 Kahn positive cases in four months (a brief and limited acquaintance with the disease). Seventy cases were regarded as tertiary and 43 were described as foot yaws. (Inadequate account taken by the author for extensive knowledge and it might be pointed out that the Kahn reaction of little or no value in diagnosis in a community where yaws is rife.)

There are brief descriptions of plantar and other lesions. Sobita (sodium potassium bisulphate) was given in 1 gram doses in 2 cc of distilled water for 12 weekly intra-muscular injections. Albuminuria occurred in some patients but in most it was only transient.

more persistent cases it cleared up on changing treatment to N A B. Clinical cure resulted in the majority the average dose of Sobita producing this was 4.2 grains. The recurring nature of the foot lesions is stressed. Intravenous Sobita was used to provoke a positive serum Kahn. In two of 14 patients completing the 12 Sobita injections the serum Kahn became negative.

A note by EVANS and KNOCK [personal communication 1943] on the pathology of yaws ulceration is included in the paper [presumably tertiary ulceration is intended]. In over half of 17 cases Vincent's organisms were found together with treponemata of the *refringens* type and others indistinguishable from *T pallidum*. [This last finding is not usual in tertiary yaws lesions.] From the pathological examination of the same series it was concluded that peri and endarteritis are less marked than in syphilis and that yaws granulation tissue is more vascular.

The author stresses the military and economic importance of foot yaws and the frequency of relapses after inadequate treatment. He advises that treatment be continued until the Kahn test is negative [It should be borne in mind that most yaws treatment in Colonial administration is intended not so much to cure tertiary cases as to render secondary cases non infectious].

C J Hackett

LEPROSY

STEINBERG Isidoro R & MENGONI H R. *Lepra familiar* [Familial Leprosy]. *Primer Congr Nac Enfermedades Endemo Epidémicas Buenos Aires 1942 Nov 9-13* 676-9 [10 refs.]

The authors define the term familial for their purpose as more than two in close relation such as parents children and brothers. A study of 170 clinical histories has revealed only three such instances. (1) A girl with mixed leprosy whose father and two brothers had died of the disease. (2) Another girl similarly affected three brothers leprosy out of a family of 11. (3) Another girl whose mother was a leper and one brother had died of leprosy seven others remaining apparently well.

The authors quote the findings of DE MOURA in Brazil in 1938 among 971 inmates of the São Roque leper colony. In 27.39 per cent some other member of the family was attacked: father and mother 7.14, mother and brothers 6.67, father mother and brothers 2.26, father and brothers 2.63, father mother and sons 1.13, husband (or wife) and sons 1.13, wife brothers and sons 0.37 per cent. [See this *Bulletin* 1939 v 36 237.] Arguello PITT in 1942 in Córdoba found only two instances among 72 investigated.

The authors then record another case of their own in the Hospital Muniz seen in 1941—a girl of 14 years with mixed lesions. She denied any contact with lepers or anyone suspected of being a leper. Examination of near relatives revealed a brother aged 17 affected, a sister aged 15 without observable lesions but with Mitsuda reaction positive, a brother aged 11 with tuberculoid leprosy, and another of 6 years with a suggestive lesion on the right thigh macular with diminished sensibility. Mitsuda was negative and the nasal mucus showed no organisms but biopsy was positive.

H Harold Scott

FAGET G H Chronicity of Leprosy New Orleans Med & Surg J
1943 Oct v 96 138 [Summary taken from J Amer Med Ass
1943 Dec. 11 v 123 No 15 998.]

Faget found among 380 inmates at the National Leprosarium in Carville La. 5 with the neural type of leprosy who have had the disease for 33 31 48 46 and 41 years respectively. Eighteen others 14 with neural and 4 with mixed leprosy have survived 30 to 40 years of leprosy and 32 (19 neural and 13 mixed cases) have suffered from leprosy for 20 to 30 years. Thus a total of 55 patients over 14 per cent of the entire population of the National Leprosarium show a chronicity of leprosy of over 20 years duration. This chronicity is found chiefly in the neural type for although neural leprosy exists in less than 30 per cent of the total number of patients at the Carville leprosarium 38 of the 55 patients (nearly 70 per cent) who had survived leprosy for more than 20 years had the neural type.

HELMINTHIASIS

GILBERT B Schistosomiasis (Bilharziasis) of the Female Genital Tract and Neighbouring Tissues J Obstet & Gynecol of the Brit Empire 1943 Oct 50 No 5 317-36 [10 refs.]

The first part of this paper gives a general account of the discovery, anatomy, life history, mode of infection, general pathology and distribution in Europe of Schistosoma. One section deals with cercarial dermatitis due to the cercariae of species other than those which cause schistosomiasis. The author thinks that systemic infection by these species is possible although it is not known. He refers to the work of PENNER who immersed a young rhesus monkey in water full of *Cercaria douthitti* and at autopsy six days later found the worms in the lung. The cases reported from Cardiff by MATHESON due to *Cercaria ocellata* are mentioned [cf also SZIDAT this Bulletin 1944 v 41 57]. The author notes that FUJIMORI, NAKAMURA and NARABAYASHI found egg of *S japonicum* in the stool of three newly born infants so that congenital infestation is possible.

Dealing in detail with schistosomiasis of the female genital tract the author who writes from S Rhodesia says that in all his cases *S haema obium* was the cause. *S mansoni* was not found. A marked characteristic was the colossal fibrosis which made surgical procedures very difficult. After describing the disease in the bladder the author says that although the general view is that the disease in the urethra is commoner in the male we must remember that the incidence is less in the female. In the female urethra the disease is usually an extension from the bladder with similar tissue changes. The commonest clinical findings are thickening and ulceration of the mucous membrane and small papillomata which may emerge from the external meatus and be mistaken for urethral caruncles. The latter are however usually on the posterior lip of the meatus while bilharzial ones may protrude from any part of its circumference. Peri urethral abscesses may cause urethral fistulae. Local thickening when it is

palpated feels like the infiltration of the anterior vaginal wall in advanced cases of carcinoma of the cervix uteri

The ureters are often affected. The fibrosis here is apt to be patchy and is most marked below the pelvic brim. Bilharzial strictures of the ureters one inch or more above their entry into the bladder may need surgical interference. The peri ureteral connective tissue may become stone hard and very difficult to deal with.

There are few references to bilharzial disease of the ovary in the literature. SYMMERS (1906 *Studies in Pathology* Quarter Centenary, Aberdeen University) described a case in a young child in which there was a fibrous mass involving the upper edge of the broad ligament and the ovary. The ovary contained Bilharzial ova. GIRGES R (1934 *Schistosomiasis* Bale Sons and Danielsson London) refers to scarred and fibrous ovaries with a large number of eggs in the parenchyma. The ovaries may be covered with a thick fibrous coat which makes ovulation impossible. The author has seen and has operated upon several cases of ovarian bilharziasis associated with bilharziasis of other parts of the genital tract and thinks that the chances of finding the eggs in the ovary alone are very small. They would be of little interest because bilharziasis would probably be found elsewhere in the genital tract. There is also a small literature on bilharziasis of the Fallopian tube. A recent case has been described from Johannesburg in which the distal end of the Fallopian tube was greatly thickened and the mesosalpinx was filled by hard fibrous tissue. The eggs of *Schistosoma* were found in the Fallopian tube and adjacent broad ligament. The tubal changes had caused the arrest of a fertilized ovum. This marked thickening of the Fallopian tube which may reach a diameter of an inch or more and of the mesosalpinx is a characteristic of the disease in these structures. GILFAND [this *Bulletin* 1942 v 39 10] described two cases.

In Gilbert's own cases there has always been considerable involvement of the broad ligament. Two of them are described. Both were in native women. In the first case in which pregnancy had never occurred bilateral tubo-ovarian masses completely obliterated the pouch of Douglas and numerous loops of small intestine were adherent to them. The enlarged ovary of each side was covered with adhesions to the rectum and lateral wall of the pelvis. Gross thickening of the broad ligament was very marked and both Fallopian tubes showed marked thickening of all layers. Cystic spaces in the masses were full of brownish fluid and both ovaries showed cysts. Eggs of *S. haematobium* were found by digestion of the tissues in 10 per cent caustic potash. The use of this fluid may be the only way of demonstrating the eggs. Abundant eosinophils were present in the affected tissues. The urine was examined only once but eggs were not found.

The second case showed similar lesions on the left side only e.g. chronic fibrosis and abundant eosinophils. Eggs of *S. haematobium* were found in the tissues and also in the urine but there were no eggs in the faeces. The author's experience is that bilharziasis of the Fallopian tube is a fairly common cause of arrest of a fertilized ovum in the Fallopian tube. He describes a case in a native woman of ectopic pregnancy due to schistosomal salpingitis. The patient had a history of a previous ectopic pregnancy probably due to the same cause. Another Rhodesian case described to the author by R. M. HONEY shows that the patients rarely know that they have been infested that dysmenorrhoea tends to increase in severity and the pain of tubal

disease becomes continuous between the menstrual periods that sterility, ectopic pregnancy and general malaise may all be clinical signs but that the menstrual cycle may not be disturbed.

The uterus as a whole is not commonly affected but treatment of its tissues with caustic potash may reveal bilharzial eggs. They have been found in the endometrium in at least three cases in the literature and also in the tissue of fibroids. Bilharzial ulcers and polypi of the vaginal cervix as far up as the internal os have been described but no case has been recorded from Rhodesia.

In the vagina the disease is not uncommon and may be primary or an extension from the bladder. The fornices are more often affected than the lower parts. In the vulva papillomatous masses closely resembling the confluent type of condylomata lata of syphilis with ulceration in some cases may occur. They affect especially the vestibule, hymen and clitoris. The clitoris and external meatus may be destroyed. The disease may simulate and co-exist with epithelioma of the vulva. In the author's cases the papillomatous condition extended laterally to the genito-crural folds back to and around the anus and forward to the top of the symphysis pubis. One case in a child of 8 years is described. Native mothers do not seek treatment either for themselves or their children until the condition has become so advanced that eggs are difficult to find. In the perineum advanced ulceration is usually found with numerous sinuses. There may be a similar affection of the vagina, urethra or anal canal but sometimes these are not affected. Eggs can be obtained from curettings of the ulcers and sinuses which are often secondarily infected.

Discussing the clinical aspects Gilbert notes that infestation usually occurs early in life. There are records of delay of the onset of the incases for as long as 20 years or intervals of amenorrhoea lasting 3-6 months or more may occur suggesting that the ovaries are involved. Most of the author's cases had normal menses and he did not find the scanty loss and shorter duration of menstruation mentioned by GRIGGS. He found that the menopause was not early as it is said to be but in many of his cases the ovaries were so much involved that they would probably have lost their function if they had been left in the body. Dysmenorrhoea is not so common as one might expect. It generally means severe involvement of the Fallopian tubes and broad ligament. Dyspareunia is usual when the disease attacks the Fallopian tube, ovarian ligament and the broad ligament. Leucorrhoea is rare in the unmarried patient with tubal disease and Gelfand (*loc cit*) suggests that its absence when there is a pelvic inflammatory mass is highly suggestive of bilharziasis. Pain is common in advanced disease but is not so common in the early stages. Usually it is suprapubic and accompanied by low backache but it may be sudden in the right or left iliac fossa and then may simulate an ectopic pregnancy. Frequency of micturition is common and there may be haematuria with eggs in the urine. Sterility may result from a mild as well as from a severe tubal bilharziasis. If a normal pregnancy occurs the foetus may die *in utero*.

Surgical treatment is usually needed. The urinary tract must be thoroughly examined by cystoscopy and ureteral catheterization. Intravenous antimony is given on alternate days the adult dose being 1 gram for the first dose gradually increased to a maximum of 2.24 grams until a total of 25-30 grams have been given. Although the

parasites and eggs may be killed by this the fibrosis is not affected
[See also GIBSON this *Bulletin* 1926 v 23 245 GELFAND & OSBURN
ibid 1944 v 41 137] C Lapage

EAST AFRICAN MED J 1943 Sept v 20 No 9 287-5 *Schistosoma
mansoni* [Editorial]

From June 1942 to June 1943 185 cases of infection with *Schistosoma mansoni* have been recorded [in Kenya Colony ?] of these 24 were in Europeans 23 in Asians and 138 in Africans. In the streams in and near Nairobi Mr G R Cunningham van Someren has identified three varieties of such snails *Bulinus tropicus* *Lymnaea caillaudi* and *Biomphalaria pfeifferi* as housing the ciliated miracidiums that hatch out from the schistosome eggs derived from the human patient and in their turn give rise to the active cercarias that re enter and infect man by burrowing through the skin.

The infection is one of the chief causes of rejection of army recruits partly for this reason and partly because of precautions that are taken it has given little trouble in the Army in East Africa J I Corson

TRIM E A Infection with *Schistosoma mansoni* *Last African Med J*
1943 Sept v 20 No 9 289-92

In the author's opinion infection with *Schistosoma mansoni* should be regarded as a general disease since the toxins of the worm are carried in the blood and the eggs are distributed throughout the body and have been found in nearly every organ. The toxæmic period of the infection is illustrated by the case of a child [race not stated] infected near Nairobi. He was admitted to hospital with high fever diarrhoea and acute abdominal pain the diarrhoea soon improved but schistosome eggs were not found in the faeces for over a fortnight. The toxæmic stage is not often seen in Africans.

The author has found that the presence of small rather rubbery discrete lymphatic glands in the groins and axillae is a useful indication of the infection.

The type of cirrhosis of the liver caused by this parasite seems to depend on the number and rate of deposition of the ova. If the number is small and the rate slow multilobular cirrhosis develops while if the number is large and the rate rapid periportal or pipe stem cirrhosis results.

One patient had all the signs of subacute intestinal obstruction and laparotomy was performed. A small amount of clear straw coloured fluid was found in the peritoneal cavity the liver was dark cirrhotic and shrunken and the mesentery was covered with white nodules varying in size from that of a marble to that of a hen's egg. Two of these masses were pressing on the descending colon just below the splenic flexure and causing the obstruction. The appearances suggested a generalized carcinomatosis but microscopical examination showed many shrunken eggs in the tumours the condition being bilharziasis of the peritoneum J F Corson

VEGHME A & O SANDON M Ectopic and Hepatic Human Fascioliasis
Amer J Trop Med 1943 Sept 1 23 No 5 545-50 3 figs
 [14 refs]

The authors report from Chile a case in which an immature fluke diagnosed as *Fasciola hepatica* was found in the subcutaneous tissue over the right eighth rib the patient also had eggs of *F. hepatica* in the faeces and the presence of another mature fluke in the liver was inferred although no signs of it were found when an operation for cholelithiasis was performed

The patient was a woman aged 52 who had had dyspepsia for 10 years For six months before she was seen she had had repeated hepatic colic and a persistent pain in the right hypochondrium There was an eosinophilia of 9 per cent After a diagnosis of cholelithiasis operation showed that the gall bladder and ducts were normal The appendix was removed and the patient's condition improved but 21 days after the operation an inflammatory painful infiltration was noted at the level of the right eighth rib this became hard non fluctuating and adherent to the skin being then rounded and about 5 cm in diameter Within it were three harder zones of a more purplish colour It was excised and a parasite was found in it which was diagnosed as *F. hepatica* by the characteristics of its parenchyma and by the presence of sections of its digestive tract excretory ducts ventral suckers and spines in the cuticle no eggs were present in it Good photographs of it are reproduced Around it there was an extensive inflammatory infiltration of the tissues with abundant lymphocytes plasma cells polymorphonuclears in groups undergoing disintegration histiocytes and giant cells Examination of the faeces showed the presence of eggs of *F. hepatica* a photograph of which is reproduced The faecal examination was repeated a week later to exclude the possibility of the first positive being due to the eating of infected sheep liver but it was again positive It was inferred that there was another mature fluke in the liver The authors suggest that both these flukes were of the same age and that the one in the skin arrived there by direct migration through the peritoneal cavity rather than through the blood stream This is in accord with the modern view that flukes reach the liver by migration through the peritoneal cavity and not by way of the bile duct

The patient's condition improved after a course of daily injections of 0.08 gm of emetine hydrochloride up to a total of 9.72 gm [sic see below] The eosinophilia disappeared and eggs were no longer found in the faeces (The recognized dose of emetine hydrochloride is 4-1 gram (0.07-0.06 gm) a total of not more than 10-12 grains being given in one course if a second course of injections is required an interval of a month should be allowed as the drug is cumulative The dosage given in this paper suggests that a mistake in the figures may have occurred)

The literature on the rare occurrence of *F. hepatica* in man is briefly reviewed In 1939 MANCERAK and ALCAN [this Bulletin 1939 1 36 676] collected 192 cases in the world literature KOURI *et al* [ibid 1939

36 676] reported 25 cases in Cuba References to six Chilean cases are given In 1942 the present authors found a case at necropsy and CROZET (personal communication) found another Dicks [ibid 1937 1 34 867] could find only eight cases in the world literature of the ectopic localization of *F. hepatica* [For other records of *Fasciola*

infection of man see *BERGE et al* this *Bulletin* 1942 v 39 703 and
D ALLAINES et al *ibid* 1943 v 40 472] *G Lapage*

PODYAPOLSKAYA V P [Diagnosis of Helminthic Infestations by the
 Examination of Scrapings from the Perianal Folds] *Med Parasit*
& Parasitic Dis Moscow 1943 v 12 No 1 83-5 1 fig [In
 Russian]

The point emphasized by the author is that while the method of taking scrapings from the perianal folds is widely practised in the Soviet Union and elsewhere for the diagnosis of enterobiasis it is also valuable for the detection of the eggs of *Taenia saginata* because the segments of this tapeworm may crawl out of the anus and wherever they crawl they leave behind a milky white track in which multitudes of eggs may be found. They do this for example in a Petri dish. *SITROM* showed that when the proglottid of this species shortens eggs are expelled from it. Scrapings of the walls of the lower end of the rectum (i.e. examination of rectal mucus) may also detect helminth egg. The scrape method depends on this characteristic crawling habit of the proglottids of *T. saginata* and would not apply to those of *T. solium*. Only 1 per cent of the author's 586 patients were infested with *T. solium* this species is excluded from his data.

Tests of the scrape and other methods made by Russian authors (the literature list is entirely Russian) are briefly summarized. Some of these authors strongly recommend the scrape method. The author's 586 patients all males were infested with *Ascaris lumbricoides* (38 per cent) *Trichuris trichiura* (75.3 per cent) *Enterobius vermicularis* (25.8 per cent) *Taenia saginata* (42.7 per cent) and *Hymenolepis nana* (1.5 per cent). The actual technique of the scrape method used is not described but it was compared with Fulleborn's method of examination of the faeces. A diagram of the results shows that the scrape method was better for the detection of *Enterobius* and *T. saginata* but faecal examination was better for the detection of *Trichuris*, *Ascaris* and *Hymenolepis*. The following are the percentages of infestations detected by the author —

	Scrape method	Faecal examination
<i>Enterobius</i>	94.7	10.6
<i>T. saginata</i>	76.0	57.2
<i>Ascaris</i>	43.5	97.7
<i>Trichuris</i>	13.6	97.7
<i>Hymenolepis</i> (9 cases only)	0.0	100.0

G Lapage

DE MEILLON B & LEECH R B A Sparganum from an East African
 Native *South African Med J* 1943 Sept 25 v 17 No 18
 289-90 1 fig

After giving a brief account of the characteristics of spargana and the life history of these worms the authors note that most cases of human sparganosis have been found in Indo-China, China and Japan [cf *BOYD* this *Bulletin* 1943 v 40 553]. One case is reported by

SAMBOU [J Trop Med & Hyg 1937 \ 10 117] in a native of the Masai tribe in British East Africa. The authors here record another African case.

The patient was a Uganda man aged about 40. Admitted to hospital for right inguinal hernia operation revealed three or four small nodules in the connective tissue round the spermatic cord as it left the external inguinal ring to enter the scrotum. Two or three of these nodules contained caseous material. One contained a white worm 3-10 cm long and another some shorter pieces. This last was examined at the South African Institute for Medical Research. Pieces of an unsegmented ribbon like worm 4 to 21 cm long and about 1 mm wide were found. Histological examination showed them to be Sparganum and this diagnosis was confirmed by ORTLEPP at the Veterinary Research Laboratories, Onderstepoort.

So far three species of Sparganum have been recorded from Africa namely *Diphyllobothrium erinacei*, *D. theileri* and *D. pretoriense* but the latter two species have been recorded only once. The author suggests that other species may be found in Africa.

The patient was born at Entebbe and had spent all his life within twenty miles of that place. His diet consisted of sweet potatoes, beans, ground nuts, matooke (banana) with some beef, lake fish and possibly large edible rats. No other nodules could be found except enlarged lymph glands in the left groin, one of which was examined and showed chronic inflammation. The authors consider that sparganosis may be commoner in Africa than the records suggest. Diagnosis being difficult unless the worms can be found. MUELLER and COLSTON in this Bulletin 1942 39 & 49 state that positive skin tests can be obtained with antigen made from cysticerci of other tape worms (cysticerci of *Taenia brisferius* of rabbits and *T. taeniaeformis* of rats and mice). Possibly the cysticerc of *T. lili* in and *T. salina* in might also give a table antigen.

FONT J H [Saravaliar] in Man Report on Three Additional Cases from Puerto Rico Bol 450 Med de Puerto Rico 1943 Sept 30 No 9 331-3 1 fig 10 ref

Referring to earlier records of the occurrence of Sparganum (mostly infections with *S. lar* *eris*) in man and in cattle the author briefly describes the worms and states that the mode of infection is not known. The intermediate host if any exists of the Sparganids of mammals has not been found. Man is an accidental host of *S. lar* *eris* which lives in the upper respiratory tract whereas *S. trachea* (of the foal) lives in the trachea and bronchi. Attached to the nasopharynx *S. lar* *eris* causes violent coughing. There may be blood stained sputum and crawling sensation tantalizing to the patient. The shape of the red male and female worms in copula may resemble a dilated capillary. In 1936 the author removed such a pair of worms from the right choana of a woman aged 33 with immediate cessation of the symptoms and in 1933 another pair with similar results from the oropharynx of a young white woman who had lost 20 lb in weight in six weeks because the coughing had interfered with eating and sleep. Recently the author was consulted about another case in which the worms were attached to the left arytenoid of a young man. Removal cured the case.

The author does not think that *S. lar* *eris* ever descends in man to the trachea or bronchi.

G Lapeere

DICKSON J G HUNTINGTON R W Jr & LICHHOLD S Filariasis
in Defense Force Samoan Group Preliminary Report *US*
Nat Med Bull 1943 Sept \ 41 No 5 1240-51

The authors are the members of a Board created by the Commanding General with instructions to study filariasis in the native population of the Samoan islands and the danger of communication of this disease to the troops quartered there. They find that there is considerable risk of infection of the troops and that infection has in fact occurred. The very characteristic type of lymphangitis which has been common in troops in this area should be regarded as filarial. The authors think that while there remains some doubt whether *Wuchereria bancrofti* is pathogenic the evidence that they bring forward is strongly in favour of the orthodox view that it causes the disease. They make recommendations for the diagnosis treatment and prevention of filariasis and consider the question of its effect on morale.

Studying the prevalence of filariasis among the natives of Tutuila one of the authors had previously found that 251 (13.6 per cent) of 1839 natives showed microfilariae in thick blood films. 4 (1.6 per cent) out of 244 children aged five years or under also had microfilariae in their blood. Very few of these children were under one year old. The average time of exposure of the children was about three years.

It is probable that the actual percentage of the population infected is much higher because there is little chance of finding the microfilariae in the blood unless there are large numbers in the circulation. Fibrosis inflammation and other unknown factors may hinder access of microfilariae to the tissues and blood. The number of adult male and female filariae present in the tissues may be considerable before there is a chance of mating for the production of microfilariae and there may be infections with single male or female filariae. Adults are prone to die and disintegrate and even if only one mosquito bite in 10 000 resulted in transmission of a filaria it seems likely that few if any Samoans would grow up free from the infection.

Failure to find the parasite in the blood of the troops does not mean that they are not infected. They have plenty of opportunity to become so. They have to be quartered in native villages and have to do much building clearance of brush laying of telephone lines as well as night and day marches in areas near to native dwellings. Moreover the troops and natives show a desire for friendly and close contact.

The authors obtained evidence of actual infection in troops by dissecting lymphatic tissue removed from 17 cases of *mumu* or acute lymphadenitis or lymphangitis which BUSTON and DURKIN *et al* believed to be the earliest sign of filariasis. In six of these cases either adult filariae or fragments of them were found (in two the worms were alive). One of these patients had been only five months in the area another had been there 9½ months and had never been in the tropics before.

The authors have discussed in an earlier report [presumably unpublished] the clinical characteristics of the lymphangitis which they regard as being filarial. In that report they emphasized that the disease was seen only among those who have been five months or more in the area that the lesions occurring in an arm or leg usually began with lymphadenitis and continued as retrograde or centrifugal lymphangitis that there was a highly characteristic scrotal lesion with funiculitis that there was a tendency to multiple involvement and recurrence and

that there were no severe constitutional symptoms. Their hospital experience to date suggests that the scrotal structures are the commonest site (funiculitis epididymo-orchitis and oedema of the scrotal skin). Thus Table I shows that out of 251 patients 185 had scrotal lesions and of these 57 (30.8 per cent) had lesions of the arm or leg also. Lesions of the leg are relatively rare possibly because the troops wear long trousers which protect their legs. They occurred in 17 (the table shows 18) patients out of 251 and in all but seven of these other structures were involved. Doubtful cases were excluded from these figures. BURTON also found that scrotal lesions were the commonest and that they were always bilateral but he found that the leg was more often involved than the arm possibly because mechanical factors favour oedema in the leg and because the native legs are not protected from bites.

Mental depression was a striking feature of the disease as O'CONNOR also noted and it persisted after the good prognosis was explained to the men so that the authors think it may not be entirely psychological. Skin tests were done with antigen prepared from *Dirofilaria immitis* because there was not enough material of *W. bancrofti*. Details of the preparation of the antigen and of the technique will be published later.

A table gives the results of skin tests done on 137 patients and 128 controls. Of the 137 patients 83.1 per cent gave both positive immediate and delayed reactions, 1.7 per cent gave positive immediate and negative delayed reactions, 12.3 per cent gave negative immediate and positive delayed reactions, and 2.6 per cent gave negative immediate and doubtful delayed reactions. Tests with extracts of *Ascaris lumbricoides* showed some cross reactions between this species and *D. immitis* so that the *D. immitis* antigen is not specific.

Discussing the prognosis the authors state that usually the acute process subsides after a few days' rest but patients should not return to full duty for 10-14 days after an acute attack and longer may be needed if the scrotum is involved. In Samoa the likelihood of recurrence is considerable but probably there will be no recurrences after the return of the patient to the United States. There is little risk of permanent deformity of the arm or leg but permanent deformity of the scrotum has been recorded and the prognosis in such cases is more doubtful. The authors think that if such cases are properly handled sterility will not occur.

The treatment they recommend is for the acute attack rest in bed and reassurance. Sulphonamide drugs have been ineffective. Patients with recurrent or multiple involvement and most of those with scrotal lesions should be taken into hospital. The patient can be assured that the disease is not so serious as malaria or as other diseases which are commoner in the United States e.g. tuberculosis and rheumatic heart disease and that he cannot transmit it to his wife or children.

Among preventive measures the authors recommend the wearing of long trousers at all times, the use of bed nets and mosquito repellents and screened quarters.

G. Lapa

ROSE H. P. & FOGEL R. H. The Psychosomatic Manifestations of Filariasis. *J. Amer. Med. Ass.* 1943 Dec 11 v 123 No 15 944-6

White soldiers mostly young unmarried men stationed in the South Pacific Islands are exposed to an environment which is particularly

apt to cause some anxiety and apprehension with regard to tropical diseases especially filariasis. DICKSON, HUNTINGTON and EICHHOLD [above] treated 251 cases of acute lymphangitis among the troops the scrotum being involved in 185 there is therefore a real foundation for some apprehension. The soldiers see many cases of elephantiasis among the natives and naturally fear that they may develop similar deformities. Since there is no known remedy for the disease and as it involves the scrotum in a high proportion of cases thoughts of the possible effect on their sexual and social life after their return home give rise to much anxiety and mental depression.

The author states that the medical officer is in an ideal position to help he can honestly give a good prognosis and should discuss the disease frankly with the men in groups and individually thereby dispelling many false ideas and relieving much of the anxiety.

J F Corson

LOEWENTHAL L J A Cutaneous Changes in Onchocerciasis *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 147-8

GIBBINS and LOEWENTHAL [this *Bulletin* 1934 v 31 399] investigated the association of cutaneous onchocerciasis with the presence of *Simulium damnosum* in certain areas of Uganda. They thought it possible that the skin eruption might be due to the irritation caused by the bites of the flies. In the present paper the author reports two cases of this form of eruption in Uganda natives who were living in places (Egypt and Mombasa respectively) where *Simulium* did not exist. Larvae of *Onchocerca volvulus* were found in the skin in both patients.

The author states that this is sufficient to show conclusively that the bites of *S. damnosum* are not the cause of the papular dermatosis. He suggests that the skin may become sensitized to the proteins of the larvae of *O. volvulus* and that the itching results from this.

J F Corson

NETTEL R Onchocercosis Vias de invasion del ojo [Onchocerciasis Routes of Invasion of the Eye] *Medicina Mexico* 1943 Sept 10 v 23 No 443 368-73 3 figs

The author concludes that the most important and frequent route to the eye taken by microfilariae of *Onchocerca* is by the skin of the eyelids and the palpebral conjunctiva. The microfilariae follow radiating lines from the nodules and become scarcer the further they get from the nodules. A variety of grades of ocular and cutaneous lesions were found in an area intensely infected with onchocerciasis. Cases were found showing (a) nodules furthest from the eye e.g. on the dorsum of the foot which showed cutaneous but no ocular symptoms or ocular symptoms were exceptional (b) a single nodule in the region of the trochanter or iliac crest in which microfilariae spread to the skin of the abdomen and thorax and were more likely to reach the skin of the face and the eye than were those of group (a) (c) nodules in the anterior abdominal wall and thorax in which there was a wide field of travel open to the microfilariae (d) nodules in the neck in which the microfilariae had a smaller field of travel but could reach the skin of the face in greater numbers (e) nodules in the head and face which often gave rise to grave lesions of the eye (f) nodules in the temporal malar

rise when somewhat similar contractions are used in the same paper for both the metric system and the apothecaries system of weights and measures

DEFICIENCY DISEASES

COCHRANE E **The Diet of the Mental Worker in the Tropics** *Caribbean Med J* 1943 v 5 No 3 28-35 [22 refs]

Many people living and working in the tropics experience more lassitude than they do in temperate climates and find mental work more difficult to do. This is usually ascribed to the climate especially the high temperature and humidity of the air. From experience in Malaya West Africa South America and the West Indies the author doubts the truth of this and of the other common explanation psychological maladjustment or neurasthenia. A vitamin deficiency especially of the B complex seemed to be a possible cause and the author made an experiment on 10 persons aged 25-60 years there were seven men and three women four were West Indians and six were from the United Kingdom. Their daily work involved considerable mental effort. Seven were given two tablets daily of Benerva Compound (Roche) each containing thiamin 1 mgm riboflavin 1 mgm and nicotinic acid 15 mgm while the other three persons took one tablet daily of Benerva vitamin B₁ containing thiamin 3 mgm. The results were apparently good nine reported less mental fatigue six noted alimentary improvement (less dyspepsia and constipation) and four had an increased appetite while four slept better. Only one from the United Kingdom and not long resident noticed no effect.

J I Corson

HENDERSON T L C **Unusual Case of Pellagra** *Lancet* 1944 Jan 1 17

The patient a male inmate of a mental hospital had congestive heart failure with oedema severe anaemia and a pigmented rash on the backs of the hands and feet and the elbows there was a patch resembling roacea on the nose and cheeks. He was given 50 mgm nicotinic acid thrice daily and within two days the oedema had disappeared the patient having passed 10 pints of urine on the first day. The dose was increased and ascorbic acid and riboflavin were added and considerable improvement took place but a few months later the symptoms reappeared and the patient died. At autopsy scirrhus malignant disease of the stomach (leather bottle type) was found and it is concluded that this had probably interfered with the absorption of food. The diet on which he had lived in the hospital was adequate. Glossitis and stomatitis were not seen.

Charles Walcott

VARMA L P **Mental Symptoms in Pellagra and Nicotinic Acid Deficiency** *Indian Med Gaz* 1943 Nov v 78 No 11 543-6 [41 refs]

HARRIS S & HARRIS S Jr **Pellagra Pernicious Anemia and Sprue Allied Nutritional Diseases** *Southern Med J* 1943 Nov v 36 No 11 739-47

This paper contains reiterations of the well known views of these workers and which have been embodied in their book on pellagra

These are mainly directed to their thesis that pellagra pernicious anaemia and sprue constitute distinct and separate diseases. The mouth symptoms and gastrointestinal symptoms in incomplete pellagra pernicious anaemia and sprue may be indistinguishable from one another especially in those cases in which macrocytic anaemia is a feature. The most effective treatment in pellagra pernicious anaemia and sprue is liver or its extracts. In this nicotinic acid may play a part as it is an ingredient of liver extract.

A distinct pathology of the liver especially fatty degeneration is common to the group whilst atrophy of the stomach and intestines is also a feature. When cord changes are found in pellagra pernicious anaemia or sprue the lateral and posterior columns are involved. In their opinion liver insufficiency appears to be a factor in the genesis of pellagra pernicious anaemia and sprue.

A hypothesis is put forward that liver endocrines control erythrocytolysis.

The hypotheses in this paper are illustrated by case reports of pellagra pellagra with subsequent pernicious anaemia the coexistence of pellagra pernicious anaemia and sprue in the same patient—an association which seems to suggest some common aetiological factor. Therefore pellagra pernicious anaemia and sprue should be regarded as allied but not identical nutritional diseases. *P. Manson Bah*

SPRUE

BRAILSFORD J. F. The Radiographic Findings in Idiopathic Steatorrhoea. *Brit J Radiology* 1943 Sept 16 No 189 283-5
7 figs

Idiopathic steatorrhoea (non tropical sprue—Gee-Thaysen disease) in adolescent and adults is associated with certain characteristic appearances in the small intestine in the bones and with symptoms attributable to hypocalcaemia and avitaminosis. The clinical and radiographic features indicate disturbances in absorption and metabolism of fat and calcium and the purpose of this communication is to explain the processes which give these radiographic indications.

The appearance and the rate of passage of the meal through the stomach and small intestine vary with the medium in which the barium is suspended. A watery suspension gives a more feathery pattern to the mucous folds of the jejunum than a milk suspension. Further more in infants during the first three months the picture does not exhibit this feathery appearance as in adults but a more irregular flocculent pattern. After the age of six months the small intestine exhibits a uniform calibre and characteristic appearance in three segments—duodenum jejunum and ileum—which merge imperceptibly into one another.

For the radiography of the small intestine in idiopathic steatorrhoea a series of radiographs should be taken in the prone position commencing immediately after the swallow. With a watery suspension sufficient has soon passed to enable the observer to visualize the greater part of the jejunum. At first the appearances are normal but within 30 minutes the barium will have gathered into small irregular curds. Some dilated coils may show a coarsely serrated periphery whilst

others show barium in shallow folds. This display of irregularity in tonicity may be associated with more rapid flow than in the normal. Within two hours barium may be seen throughout the whole course of the large intestine which is dilated as far as the rectum even though half of the meal is still in the stomach. Much gas may be seen in the large intestine. Haustration of the transverse and descending colon is usual.

These appearances suggest that change in the barium pattern is due to derangement in the innervation of the muscularis mucosae. The appearance bears some resemblance to that seen in the newly born infant. Improvement in the appearances of the small intestine have been noted after injections of liver extract administration of nicotinic acid and the vitamin B complex.

As the result of disordered function of the small intestine the metabolism of fat and calcium is impaired. The bones exhibit radiographic features which are sometimes distinctive whilst in others suspicion of infantile renal rickets or hyperparathyroidism may be aroused. The bones in uncomplicated idiopathic steatorrhoea do not exhibit a compact cortex though their peripheries are clearly defined. This is distinctive so that the cancellous tissue extends and forms the periphery of the long bones giving a fine crenated appearance.

The main trabeculae in the long bones run for the most part in the direction of the long axis and appear to be more clearly defined and less closely packed together than normal. The metaphyses at the extremities are of greater depth the diaphyseal extremity being blurred as in rickets. These features are well shown in the hands and forearm. In the adult general decalcification of the hand skeleton may be associated with deposition of calcium in the extremities of the terminal phalanges. The skull in the adolescent usually shows a fine stippled osteoporosis whilst later general decalcification may be associated with multiple ill defined islands of varying size and density.

The long bones of the extremities eventually are unable to bear the weight of the trunk and they bend producing coxa vara and genu valgum. The disorganization and weakening of the metaphyses may lead to displacement of the diaphyses. The vertebral bodies tend to show disk compressions of upper and lower surfaces so that they tend to become biconcave.

These findings tend to show that the composite picture of the radiographic appearances of idiopathic steatorrhoea has not been appreciated sufficiently by the physician or surgeon in order to impart that broad outlook essential for satisfactory treatment. *P Manson Bahr*

BIRD J G Tropical Sprue Review of Literature *Bol Asoc Med de Puerto Rico* 1943 July v 35 No 7 267-83 [46 refs]

VENOMS AND ANTIVENENES

WATERMAN J A Pancreatic Cyst following Scorpion (*Tityus trinitatis*)
Sting *Caribbean Med J* 1943 v 5 No 3 136-41

The author has previously noted that haemorrhage in the pancreas as well as elsewhere may be seen at autopsy after death from scorpion

ting in Trinidad [this *Bulletin* 1939 v. 36 572] The case here recorded is that of a Hindu labourer who in 1934 was stung by a scorpion. Soon after this he noticed a small swelling in the upper part of the abdomen. This increased in size and when he was admitted to hospital a cystic mass was observed in the epigastrium causing dyspnoea. Three pints of a thick dark brown fluid were removed but the swelling was not appreciably reduced and eight days later the distress being unrelieved another 24 pints were withdrawn. After an interval of comparative comfort some six weeks later another 13 pints of similar dark brown fluid containing blood cells rhombic crystals and granular debris were removed.

A year later the patient was readmitted having in the interval suffered from bouts of fever and the cystic fluid had reaccumulated. Operation revealed a cyst extending up to the fourth rib in the left anterior axillary line and 17 pints were withdrawn slowly leaving behind a muddy mass of disorganized tissue. The cyst was too large and the adhesions too firm for it to be dissected away so it was packed and marsupialized. Death occurred three days later.

[The title says following which in point of time is true but whether in the sense of due to is not proven though a haemorrhage such as the author has reported might have caused obstruction of the duct and subsequent cyst formation. The pathologist did not report any signs of cystadenoma but found flattened pancreatic tissue incorporated in the cyst wall.]

H. Harold Scott

SAMPAYO R. R. L. Toxic Action of *Latrodectus mactans* Bite and Its Treatment. Clinical and Experimental Studies. *Amer J Trop Med* 1943 Sept v. 23 No 5 537-43 [37 refs.]

When guineapigs are bitten by a *Latrodectus mactans* the following symptoms may be observed: (1) Acute evolution with bronchospasm and intense nervous symptoms ending fatally in 24 hours or less. (2) Initial nervous symptom with paresis but little respiratory disturbance then temporary recovery followed by death later. (3) Recovery after a period of restlessness excitability polypnoea and tremors. In a few animals no symptoms are observed. Similar results are produced by subcutaneous injection of half a cephalo-thorax when macerated.

The toxin is 40-60 times as potent as that of *Latrodectus geometricus*. Rats white mice dogs rabbits and toads are far less susceptible to the venom than are guineapigs. The venom is destroyed within 15 minutes by a temperature of 60°C. The eggs of *L. mactans* are venomous and have haemolytic properties. At autopsy guineapigs show pale enlarged inflated lungs or if death is delayed a reddish marbled appearance with areas of atelectasis renal and hepatic congestion is present and chromatolysis of the large pyramidal cells.

In the dog the symptoms are mainly gastro-intestinal—nausea vomiting diarrhoea—with excitability and tremor and post mortem gastric haemorrhage and rectal petechiae are found.

The effects in man have been admirably detailed by the volunteer patient whose record has been given in this *Bulletin* [1936 v. 33 401]. The symptoms are very suggestive of some acute abdominal condition such as ruptured peptic ulcer. The differences are tabulated by the author thus —

Spider bite

- a Positive for bite
- b No ulcer history
- c Course of spread from bitten area to abdomen
- d Mild or no collapse
- e Temperature normal or slightly elevated
- f Pulse slightly faster
- g Abdomen rigid
- h Cramping of extremities
- i X ray negative for gas bubble
- j Can sit up or move about

Ruptured Peptic Ulcer

- a Negative for bite
- b Ulcer history
- c Knife like pain at point of rupture
- d Collapse
- e Temperature subnormal
- f Pulse usually normal
- g Abdomen rigid
- h No cramps of extremities
- i X ray evidence of gas bubble in majority of cases
- j Remains very quiet Does not want to be moved

As regards treatment local applications and attempts at extirpation are useless absorption being too rapid. If available antivenene prepared from horses is given 10 cc subcutaneously or in very serious cases intravenously. If this is not obtainable recourse is had to morphine calcium gluconate (10 cc of a 10 per cent solution intravenously) rest in bed diuretics cathartics hot baths and symptomatic treatment. The prognosis *quoad vitam* is good in man [but Emil BOGEN states that the fatality rate in man is 5 per cent. (See this *Bulletin* 1937 v 34 728)]

H Harold Scott

DERMATOLOGY AND FUNGOUS DISEASES

GANDOLFO C F STEINBERG ISIDORO R RUGIERO H R DEL PONTE L CRIVELLARI C & CORIA J B Observaciones sobre posible mal de Pinto en el noroeste santafecino [The Possible Existence of Mal del Pinto in North west Santa Fé] *Primer Congr Nac Enfermedades Endemo Epidémicas Buenos Aires 1942 Nov 9-13* 217-19

When examining a patient with cutaneous leishmaniasis the authors observed maculae symmetrically distributed. They then examined others working in the Argentine forestry in the same district and found several with these patchy maculae reminiscent of pinta. Questioning these the authors were told that there were several affected like them and they denominated them *oceros* [not a very complimentary term overo is a blossom coloured horse]. Examination of 2 000 of the workers revealed about 50 cases of the condition and they found in two cases forms like spirochaetes and conclude that by reason of the endemicity of the lesions in a zone where blood sucking insects abound the disease is mal del pinto [Confirmation should not be difficult to obtain]

H Harold Scott

MANDOUL H & MANDOUL R A propos des taches dyschromiques du mal del Pinto [The Dyschromic Blotches in Mal del Pinto] *Ann Parasit Humaine et Comparée* 1942-1943 v 19 Nos 4-5-6 116-23 [29 refs]

In the past when the cause of *mal del pinto* was believed to be mycotic the various colours brown blue red etc were ascribed to

chromogenic moulds. When the cause was found to be a spirochaete the question naturally arose as to how these colourations were produced. An explanation is offered in this article and would seem to be simple and the colours purely physical.

In all the coloured areas only one pigment a black pigment identical with the normal melanin of the skin is present. According to South American authors the red colour is due to inflammatory effects and consequent erythema and the blue to the effect of seeing the melanin through layer of the skin or as they expressed it to the caeruleaence of the tissues.

The authors compare the colour changes in punta to those of the sky and of the sunset as due to diffusion by cloudy media (milieux troubles). A more homely example is the reddish tint of cigarette smoke in front of a window and the bluish tint of the smoke when one turns one's back to the light and faces the darker background of the room.

Applying these facts to the colouration of *mal del punto* the authors state that normally the melanin is in granular form in the basal layer of the epidermis and the cells of Langerhans and in the melanophores of the reticular layer of the dermis. The brown areas are caused by increase of pigmentation in the epidermis associated with dermal hypochromia the white or vitiliginous areas are due to achromia from cutaneous atrophy and disappearance of the normal pigment in the epidermis. Areas result from diminution of the normal pigment in the epidermis and increase in the dermis here it is found accumulated in the melanophores or free in the dermal connective tissue—or to be seen through the cloudy medium of the epidermis—red over the opaque screen of the deeper pigmented melanin layer (like the blue of a tattooing with the sparsely disposed gran in the epidermis). Finally the red the intensity of this depends largely on the degree of erythema and on the blood pigment haemoglobin but also on the natural colour of the patient's skin. They are according to LEON and BLANCO the equivalent in a fair skin of the blue patches in a dark skin the normal dermal pigment in the former being in separated foci in the latter in a continuous screen.

H Harold Soff

McC. RUTH L. Tropical Mycoses J A Ger Med Ass 1943 Oct 23 v 123
No 8 449-51 1 fig [7 refs]
A general account

MISCELLANEOUS

COLONIAL OFFICE ADVISORY COMMITTEE ON EDUCATION IN THE COLONIES
Mass Education in African Society Colonial No 186 63 pp 1 fi
1943 London H M Stationery Office [1]

ALL MINISTERS Health Hints for Warm Climates for all Personnel
proceeding to the Tropics and Subtropics 1st Edition A M
Pamphlet 160 D G V S No 2 Issued by Authority of the Air
Member for Personnel Air Ministry 1943 Sept 24 pp 25 fies

This pamphlet is intended for the non medical members of the
Royal Air Force and contains much valuable advice on the prevention

of disease. It is written in a happy style lightened by touches of humour and is illustrated by quaint line drawings which admirably emphasize the points made.

The sections deal with —preparation of kit care of the health when travel is made in transit aircraft (with instructions on the prevention of malaria dysentery venereal disease and yellow fever) or on a troop ship general health instructions dealing with water salt food alcohol clothing personal hygiene rest and the dangers of native bazaars and general camp sanitation. Notes are given on a dozen of the common or dangerous tropical diseases. In these sections the information is generally accurate with a few exceptions but many of the points are repeated unnecessarily in different parts of the pamphlet. Had repetition been avoided more information could have been given with advantage to the reader. For instance although fly transmission of bacillary dysentery is emphasized more than once the importance as a measure of prevention of washing the hands after visiting the latrine especially by those who handle food is not directly mentioned. The uninformed reader would obtain on page 3 the impression that a single bite by any mosquito may cause malaria. On the same page it is stated that worms in the soil may burrow into the feet and cause ankylostomiasis and bilharziasis. More correct statements are made in later sections yet such remarks must confuse the reader.

Nevertheless the pamphlet contains much sound sense and should be useful especially if it were made the basis of explanatory talks by medical officers.

Charles Wilcocks

FISCHER L. Beitrag zur Kenntnis der Afghanischen Volksheilkunde
[Medical Folk Lore in Afghanistan] *Deut Tropenmed Ztschr*
1943 July 1 v 47 No 13/14 346-54 [12 refs]

Owing to its geographical position Afghanistan has been influenced by the cultures of many races. The Greeks brought their doctors and evidence of their art still exists throughout Central Asia later came Arabian Persian and Indian medicine. The first English doctor arrived a hundred years ago and an Emir appointed an English court physician. The influence of the Indian doctors gradually decreased an increasing number of European doctors arrived and to day there is a small medical faculty in Kabul. Modern Afghanistan has given up many of the old practices but medicine is still restricted by old religious laws which obstruct progress as for example by forbidding autopsies and hindering the study of women's diseases.

The people are mostly illiterate and one third are nomads. Old traditions have been obstinately preserved not only in the mountain villages but also in the cities. the *hakim* practises in the bazaar and the *mullah* is often called to the patient together with the doctor. the author has often visited his patients in company with the Mohammedan priest. Modern Afghans firmly believe that demons and ghosts bring sickness and bad luck and seek their aid by sacrificing sheep.

Among the causes of illness vapours are supposed to be especially important—a relic of Greek medicine when in the vessels they cause rheumatism vertigo headache and other illnesses. Haemorrhoids are another cause of various illnesses affecting the head body or limbs. Errors of diet are often held to cause not only gastrointestinal troubles but also rheumatism apoplexy fever even gonorrhoea (the name for

which includes cystitis and calculus) Some foods harmless alone are said to be injurious when mixed together e.g. milk and fish. Certain food and medicines are called warm and others cold. Examples of the former are pices, honey, meat, nuts, leeks, peppers and onions, and morphia and quinine. The author thinks that these ideas had their origin in the four elements of Empedocles: cold, hot, damp and dry [Air, fire, water and earth]. Acid foods like citrons and pickled vegetables are not taken in diseases of the throat and chest while in fevers such as typhoid fever the warm foods should be avoided. Curdled milk (Doghurt) is the only food allowed in dysentery. Having become convinced of its value the author has always prescribed it. Another form of curdled milk containing salt and leek or cucumber is used as a cold food for warm fevers. Little can be said about the medicine of the hakim of the bazaar who carefully preserves the secrets of his art.

Indigenous medicinal plants are numerous but the Government only recently took an interest in them. A French botanist was appointed to collect and study them. Anise, asafoetida, artemisia (santonin), betel, caraway and coriander are used. Opium is very much less used than in Persia and addiction is rare. Indian hemp is smoked in the hookah but is prohibited by the Government.

Bloodletting is much practised by all classes. The older people still do venesection in the spring of the year but it is mostly left to the doctor nowadays and many avoid it even when prescribed. Wet and dry cupping are much used, as are cauterization and the Bier type of venous congestion. Enemata and purgatives are also very commonly employed.

The country contains mineral springs. Some of the waters contain sulphur, others arsenic, others carbonic acid. *J. F. Corson*

PRESTON, P. G. Six Year Maternity Work amongst the Wakikuyu at the Native Hospital Fort Hall. *East African Med. J.* 1942 Oct & Nov, 1, 19 Nos 7 & 8 223-32, 247-57.

To the question: How is it that African women produce their children so much more easily than the Europeans? the author replies: They don't, and in this interesting and well tabulated account of six years' obstetric work among an East African tribe he describes the prevalence and the nature of abnormalities of labour which he encountered and discusses briefly their probable causes.

The work described was done over the period 1936 to 1942 at the Native Hospital Fort Hall, Kenya, where a maternity block had been built on to the hospital. The number of patients increased yearly, whereas in 1936 there were only 15 new ante-natal cases and 39 deliveries; in 1941 there were 408 and 337 respectively.

Among the commoner conditions seen at the ante-natal clinic and requiring treatment were helminthiasis, malaria, albuminuria and syphilis. Disproportion between pelvis and foetus often necessitated admission to hospital. Of the 1,099 total deliveries over the six year period 790 were normal, 309 abnormal and there were 63 maternal deaths. Live births totalled 929, still births 190 and neo-natal deaths 47. Of the abnormal labours there were 101 forceps deliveries, 63 episiotomies, 46 Caesarean sections, 31 versions, 28 craniotomies and 15 cases of ruptured uterus.

The author gives figures of pelvic and foetal measurements. He found that the average Kikuyu woman is somewhat diminutive in

height and has a miniature or funnel shaped pelvis which is liable to cause delayed or obstructed labour. The length and weight of the average Kikuyu child were found to be slightly less than those of the European but the occipito frontal diameter of the Kikuyu foetal skull is longer and the moulding of the skull correspondingly much more pronounced. Obstructed labour was therefore of frequent occurrence and vesico vaginal fistulae of the mother and intra-cranial haemorrhage in the child frequent sequelae.

Malaria was prevalent among mothers. The author considers that abortions seem to be common as a result of the patient developing malaria. Ante and post partum haemorrhage and eclampsia were rare. Among still born and new born infants prematurity and intra cranial haemorrhage figure largely as causes of death.

The probable effect upon childbearing of such customs as female circumcision and the carrying of heavy loads which are so usual among the Wakikuyu is discussed.

The report with its numerous statistical tables should be an interesting obstetric and social study for comparison with work of a similar nature in hospitals in other parts of Africa where different conditions as regards diet, environment and social customs are found.

Mary G Blacklock

GAMBIA ANN MED & SAN REP FOR YEAR ENDED 31ST DECEMBER 1942 Appendix III 12-14 2 folding graphs Summary of Report on Infantile Mortality in Bathurst by Dr D W HORN

From 1916 to 1924 the infant mortality rate in Bathurst averaged about 450. In 1925 a maternity service was started and the rate declined to 220 in 1931 but rose during the economic depression. In 1934 there was an epidemic of yellow fever which led to new public health legislation and the infant mortality rate in 1940 was 134. The rate rose to 243 in 1941 and 240 in 1942. Hospital records show that over 80 per cent of infant sickness between August and November 1942 was due to malaria but this was during the malaria season at the end of the rains and may not be characteristic of the whole year. Malaria has however been more prominent in Bathurst recently partly no doubt owing to immigration of non immunes and to the introduction of foreign strain of malaria parasite. In 1942 malaria caused 36.4 per cent of all infant deaths and in 1942 it was rivalled only by the respiratory diseases. The author notes that malaria control is insufficient and that general sanitation is poor. There is overcrowding and defective nutrition.

Tetanus was at one time a formidable problem in infants but since 1935 the incidence has fallen almost to nothing. This is probably due to the prohibition of cattle in Bathurst and to the better standard of midwifery in the town since the passing of the Public Health Ordinance and Midwives Ordinance in 1935.

Charles Wilcocks

BELL T Acute Meningococcal Septicaemia a Note on this Disease in Africans East African Med J 1943 Sept v 20 No 9 314-17 2 figs on 1 pl

This is an account of four cases of fulminating meningococcal septicaemia in African natives with petechial haemorrhages in skin and

conjunctiva and clear or faintly opalescent cerebro spinal fluid. There was no neck rigidity. In the first case which was fatal in 17 hours meningococci were easily found in blood films and post mortem the adrenals were found grossly haemorrhagic. In the second and third cases which were clinically very similar no macroscopic adrenal haemorrhage was found. The precise pathological basis of the deaths was not elucidated. In all three fatal cases consciousness was retained to the end. The fourth patient also quite conscious throughout recovered under sulphapyridine treatment. The pulse which was very weak and rapid on admission became normal in rate and volume in four days.

[These cases do not differ materially from acute forms of the disease seen in white people especially during the early virulent phase of an epidemic.] *H S Banks*

STEPHENSON R W & KIRK R. Jaundice of Obscure Origin in El Obeid Kordofan Province Sudan. *Trans Roy Soc Trop Med & Hyg* 1943 Dec 1 37 No 3 189-94 3 figs on 1 pl [39 refs]
 Summary appears also in *Bulletin of Hygiene*

It is becoming increasingly evident that there are large numbers of cases of jaundice of unknown aetiology in many parts of Africa. The authors have recently been able to study two groups of these in the Sudan and compare them with cases of relapsing fever (with jaundice) and yellow fever which were occurring at the same time. Observations were made in the town of El Obeid with a population of about 38 000 where one of the authors had observed a similar group of cases seven years previously.

Those of the present study fall into two distinct clinical groups. The majority occurred in the rainy season and 37 of the 46 patients were aged 20-40 years. There was little or no connexion between cases.

In one group of 18 there were four deaths. These patients showed pyrexia, headache, restlessness, transient albuminuria and a small pointed tongue with clean edges. Jaundice developed 4 to 6 days after the onset and cleared fairly quickly in the mild cases. In only two was there vomiting and none showed any abdominal symptoms. Three had an enlarged liver and one a palpable spleen.

In the second group were 28 cases with two deaths. The main symptoms and signs were abdominal discomfort or pain, a large flabby thickly coated tongue, enlarged liver and light or clay-coloured stools. Nausea occurred in some and vomiting in five. The spleen was palpable in twelve. In contrast to the first group pyrexia was present in only five patients. All laboratory findings were negative. All histological material was obtained by the viscerotome. The lesions in the livers of the four fatal cases from group I resemble in many ways those found in biopsy material from patients suffering from infective hepatitis. Oddly enough the material from the two cases in group II showed substantially normal liver tissue. *F O MacCallum*

MACQUILLAN C J. Tetanus in Tanganyika Territory. *East African Med J* 1943 Oct 1 20 No 10 323-7

The mortality rate in 127 cases of tetanus in African in Tanganyika Territory who were treated during the years 1935-8 was about 5% per cent and of 141 treated between 1934 and 1942 78 (55 per cent) died.

The great majority of these patients received no antitetanic serum and of those who were treated with serum very few received an adequate dosage. Since the mortality rates reported by most other workers in serum treated cases have been about the same as these or higher the author concludes that the expenditure (£20 per head) for what is regarded as adequate serum treatment is unjustifiable amongst a primitive people whose annual tax per person is only twelve shillings.

Sulphonamide was used in some cases but appeared to be ineffective. Prophylactic administration of serum and modern methods of cleaning wounds are advocated. Active immunization with toxoid would be suitable for troops and certain other groups of people in Tanganyika Territory but is not practicable for the general population.

[In the case of such a fatal disease as tetanus it may be suggested that treatment provided by Government should not be withheld for reasons of expense associated with the small tax paying ability of the population. The results and conclusions of PATERSON (*Med Jt of Australia* 1930 v 1 832) and YODH (*Brit Med J* 1932 Sept 24 589) and the experiments of SHERRINGTON (*Lancet* 1917 Dec 29 964) and of FIORO (*Arch Surgery* 1940 v 41 299 reviewed in *Bulletin of War Medicine* 1941 Jan No 3 181) indicate the need for further investigation. It seems desirable that the opportunities afforded in the Colonial Medical Service should be fully used.]

J F Corson

BARDHAN P N. Sulphonamides in Undulant Fever. *Indian Med Ga* 1943 Nov v 78 No 11 535-7 [13 refs]

Three cases of undulant fever all diagnosed by blood culture and agglutination tests were treated with sulphonamides.

Case 1—Treatment begun on the 18th day of illness. prontosil album [sulphanilamide] 0.5 gm four hourly for 48 hours and prontosil rubrum 5 cc i.m. daily for 3 days. [Perhaps prontosil soluble was given as prontosil rubrum is almost insoluble in water.] Fever subsided on the third day of treatment and 0.5 gm [prontosil rubrum?] by mouth *t.i.d.* was continued for three more days. Fever returned on the 37th day of illness and 0.5 gm of prontosil album was given four hourly for 48 hours. the temperature fell but not to normal and sulphonamide treatment was discontinued. The patient was discharged on the 69th day free from fever but anaemic and weak. there was no relapse.

Case 2—Treatment begun on the 23rd day of illness. urea sulphazide (a sulphonamide preparation of the Union Drug Co. of Calcutta) 5 cc i.m. twice daily for 4 days and once daily for 2 more days. The temperature fell to normal on the 26th day of illness rose slightly from the 35th to the 38th day but no further injections were given.

Case 3—The day on which treatment was begun is not stated. an initial dose of 2 gm of sulphanilamide was followed by 1 gm four hourly during 4 days to a total of 26 gm. The temperature became normal on the 42nd day but varied between 98.2 and 99.6 F for another 6 days. sulphanilamide 0.5 gm was given four hourly for 48 hours and the temperature became normal.

The author concludes that the result of Case 1 was indefinite but in Cases 2 and 3 the drug controlled the fever and perhaps prevented relapses. he adds that success with one case each treated with urea sulphazide and sulphanilamide is too little material to justify conclusions.

J F Corson

GELFAND M. Onyala. *Clin Proc Cape Town* 1943 Sept 12 No 9
281-6

A general account of the disease

DAGGETT W. I. Desquamative Otitis Externa. *Med Press & Circular*
1943 Dec 8 362-5

The condition described is an important one for practitioners in warm climates and at the present time particularly because it is common under war circumstances among those serving in hot damp districts such as along the Mediterranean littoral. Other names for it are Singapore ear or Hot weather ear. Correct diagnosis, early recognition and prompt treatment lead to speedy recovery whereas wrong diagnosis or failure to apply appropriate treatment owing to mixed diagnosis may mean chronicity. It is a diffuse otitis externa but by no means the only form and it is often dismissed in a few lines in the text books. Under the term diffuse otitis externa are included the subject under discussion designated aptly by the author desquamative otitis externa and also eczema seborrhoeic dermatitis dermatitis venenata and otomycosis.

The author describes very clearly the different stages which the desquamative otitis may present—acute, subacute and chronic—though they may overlap and one pass into the other, the acute or subacute into the chronic or the chronic flare up and become acute. Being most common in the hottest months of the year it has been ascribed to sea bathing, but says the author there is no foundation for this belief though bathing may be a contributory factor in a few cases.

Since prompt recognition and treatment are essential to speedy cure and text books rather ignore it it will be well to give a fairly full abstract of the author's description. In the *acute* form there is discomfort in and round the ear soon becoming a throbbing pain radiating to the angle of the jaw and succeeded by a little watery discharge. Owing to narrowing of the meatus and perhaps swelling of the periauricular tissues examination by speculum may be difficult. In a few hours desquamated cells and debris accumulate deep in the meatus. In the *subacute* stage these symptoms are modified but loss of sleep causes irritability and there may be some degree of cervical adenitis. Debris and pus collect in the deep meatal recess. When *chronic* the condition causes considerable irritation and the patients may make things worse by probing and scratching with a match stick. Granulation may be seen where the epithelium is lost and the discharge is very offensive.

The organisms concerned are mainly diphtheroid with which may be associated Proteus, *Ps. pyoverdina* and *Staphylococcus* if it is in the order of frequency.

The first thing in treatment is to remove carefully and as completely as possible all the collected debris and detritus—sometimes a tedious proceeding. For the deep meatal recess it is best to use a fine wool carrying probe bent to the angle required. It is useless and wrong to wait until the swelling subsides before attempting to clean the meatus. The somewhat raw surface left after the cleansing is best treated by an astringent applied by means of a wick of half-inch

ribbon gauze ear drops are not so satisfactory Tannic acid 2.5 per cent solution may be used but the author prefers the following —

R

Plumbi acetat	gr	x
Burow's solution	5	1
Aq menth pip	5	1

Burow's solution contains aluminium acetate. The wick is soaked with the fluid twice in 24 hours and a fresh wick is inserted the next day. Usually in 48 hours improvement is such that boric acid powder may be insufflated and the ear left alone. If it does not clear up then things are left for 3-4 days except for wiping away discharge and the above procedure then repeated.

Other applications such as silver nitrate triple dye brilliant green etc give rise to a coagulum which obscures the process beneath and allows infection to continue [See also this *Bulletin* 1943 v 40 565]

H Harold Scott

HARDIKAR S W & RAO V G Ascites in Hyderabad (Deccan) A Preliminary Note *J Indian Med Ass* 1943 Oct v 13 No 1 1-9 2 figs

This is a preliminary note giving a few clarifying facts and asking for information rather than imparting it. As such it is a valuable introduction for ascites is relatively common in Hyderabad but its cause remains obscure.

At the Osmania Hospital during the years 1940-41 of 32364 in patients 490 (1.5 per cent) had ascites. The sexes were equally involved there being 263 cases among 17869 males (1.47 per cent) and 227 among 14495 females (1.56 per cent). The authors compare Vizagapatam and Hyderabad with Massachusetts and Bombay hospitals and show that ascites was associated with cardiac insufficiency in 45.4 and 67 per cent respectively in the latter but in only 23.3 and 27.5 per cent in the former. Cirrhosis of the liver however accounts for only 10 per cent in Massachusetts and for 12 per cent in Bombay in contrast with 46.3 per cent in Vizagapatam and 28.5 per cent in Hyderabad. Delhi more closely approximates the former in both respects for here 37 per cent are associated with cardiac insufficiency and 8.9 per cent with cirrhosis of the liver. Hepatic cirrhosis is commoner in south eastern India where rice is the staple diet than in the north western where *jawar* [millet] and wheat are the chief foods. In nearly 20 per cent (90 of the 490) of the Hyderabad cases no definite cause could be assigned. Pulmonary tuberculosis anaemia and the dysenteries are not specifically mentioned as causes in Massachusetts but account for 22.7 per cent of the Vizagapatam cases and 14 per cent of those seen in Hyderabad. Of the 90 with unassignable cause 55 were 40 years and over and 30 between 20 and 40 years. 44 had oedema also 25 had ascites without oedema and 21 had oedema without ascites. [These seem difficult to reconcile with the statement that these were among the 90 cases of ascites without definable cause.] These obscure cases are ascribed to diet deficient in quality and quantity though its mode of operation is not known. Recovery on proper dietetic treatment in hospital is rapid. A few illustrative cases are detailed.

H Harold Scott

HENNESSEY R S F A Note on Endotheliomatous Tumours encountered in Uganda *E Afric Med J* 1942 Nov 19 No 8 236-42

The well recognized difficulties of defining the characteristics of endothelioma are discussed in his investigation the author decided to reserve the term for tumours in which the proliferative cells occurred in irregular groups or masses.

Among 477 tumours examined histologically at the Kampala laboratory during the years 1937 to 1942 inclusive there were 28 endotheliomata all occurred in Africans. They arose from the following tissues skin or subcutaneous tissue (15) subconjunctival tissue (3) nasal mucosa (2) breast () bone (2) muscle (1) retrobulbar tissue (1) perineural tissue (1) and 1 not stated. The body areas in which the first tumour appeared were head (12) leg or foot (5) thorax (3) abdomen (1) arm (1) and 3 not stated.

The author mentions the following points of special interest many of the tumours showed signs of chronic inflammation there were 3 cases of Kaposi's Sarcoma only 4 of the tumours showed rapid proliferation in 1/3 there was evidence of local infiltration and in 7 the growth was well encapsulated endothelioma is suggested when there is a smooth firm nodule or group of nodules covered by a thin epidermal layer dark red in colour especially if situated on the lower extremity if ulcerated it may simulate a squamous carcinoma

J F Corson

CUTKAMP L H Toxicity of Rotenone to Animals A Review and Comparison of Responses shown by various Species of Insects Fishes Birds, Mammals etc *Soap* New York 1943 Oct 19 No 10 107 109 111 113 115 123 3 figs [30 refs.]

A review has been made of the acute toxicity of rotenone to a wide range of animals. Most of the data relate to oral administration and the results are expressed by the median lethal doses in mgm per gm of body weight. The relative toxicity of rotenone compared with other orally given insecticides (arsenical, fluorine compounds etc.) is shown graphically for four insects two birds and three mammals. A further figure gives the toxic doses for a number of warm blooded animals by intravenous intraperitoneal intramuscular and subcutaneous injections. [These doses are naturally considerably lower than by oral administration.] Finally there is a table of results of immersing various animals in aqueous suspensions of rotenone. In general difference in resistance to rotenone poisoning were not all correlated with the classification of the various animals which included worms molluscs arthropods fish and frogs.

[While this is a useful rough guide to the toxicity of rotenone it must be remembered that the measurements were made by many different workers and that the toxicity of this compound is influenced by its carrier liquid and by the presence or absence of analogous compounds in samples of dermis]

J R Buxton

PARR H C M The Culex Mosquitos of Syria and the Lebanon *E Afric Med J* 1943 Dec 34 Pt 4 45-51

- NALIS J A & MOTTA O C Sobre cinco casos de coccidiose humana por *Isospora hominis* Fantham 1917 observados em Belo Horizonte [Five Cases of Human Coccidium *Isospora hominis* Fantham, 1917, observed in Belo Horizonte] *Mem Inst Biol E equiel Dias* Belo Horizonte 1939 & 1940 v 3 & 4 79-92 2 figs on 1 pl [17 refs] English summary
- & SOBRINHO O P Sobre um caso de coccidiose humana por *Isospora hominis* em criança [One Case of Human Coccidium *Isospora hominis* in a Child] *Ibid* 95-104 3 figs on 2 pls [10 refs]

Both these papers record cases of *Isospora hominis* infections the first five cases in adults and the second one case in a child six years of age all of them residents of Belo Horizonte in Minas Geraes Brazil The microphotographs illustrating the papers show oocysts characteristic of this human coccidium

C M Wenyon

- GUIMARAES F N Toxoplasmose humana Maningoencefalomielite toxoplasmica Ocorrência em adulto e em recém-nascido [Human Toxoplasmosis] *Acta Med* Rio de Janeiro 1943 Aug-Sept v 11 No 8-9 127-31 English summary

After reviewing the published records of cases of human toxoplasmosis the author gives a short account of two cases which he has encountered in Brazil One was in a rural labourer 18 years of age The illness which terminated fatally was of 37 days duration There was high fever accompanied by cephalalgia and various pareses At the autopsy encephalitis pericarditis hepatitis splenitis nephritis and bronchopneumonia were found Parasites were free or intracellular or included in pseudocysts The second case was in an infant suffering from hydrocephalus from birth When seen at the age of 14 months there was hydrocephalus accompanied by tremors and convulsions Guineapigs were infected by inoculation with spinal fluid taken before and after the death of the child The parasites were inoculable to dogs and other laboratory animals including pigeons though some of these birds which had recovered from pigeon toxoplasmosis were immune

C M Wenyon

- WEINMAN D Chronic Toxoplasmosis *J Infect Dis* 1943 July-Aug v 73 No 1 85-92 2 figs [13 refs]

The clinical study of toxoplasmosis in man has made it possible to distinguish two main types The disease in children is an acute or semi acute encephalitis attended by pronounced neurological symptoms associated sometimes with hydrocephalus and optic involvement In adults the manifestations are different Neurological involvement is insignificant the conspicuous lesions being in the abdominal and thoracic viscera and producing symptoms which vary with the intensity of infection in individual organs The mortality of these cases is very high but the diagnosis has in nearly all been made after death The fact that the infantile form can be acquired congenitally from parents who have been healthy has suggested that in man the infection may exist in a chronic form causing few or no symptoms Experiments on animals would appear to support this view Mice which recover from an acute attack are for some time immune to further

inoculations but the recovery does not result in complete elimination of the organisms. Later this immunity is lost and susceptibility to inoculation is regained. In recovered animals the organisms persist in the brain and inoculated to other mice prove just as virulent as they did originally. Examination of sections shows that in the acute disease the organisms are altered in necrotic areas in the brain and other organs. With recovery the necrotic areas tend to disappear but the organisms persist in pseudocysts in the brain. These pseudocysts containing large collections of organisms are the result of cells being tended to such an extent that merely a membrane remains. They cause less tissue damage than the isolated parasites for generally they are not surrounded by inflammatory cells. The author believes that the occurrence of the congenital infection in the children of healthy parents makes it nearly certain that this chronic type of disease exists in man though it has not yet been discovered. C M Henson

WEINMAN D Effects of Gramicidin and Tyrocidine on Pathogenic Protozoa and a Spirochete *Proc Soc Exper Biol & Med* 1943 Oct v 54 No 1 38-40

The two substances tyrocidine and gramicidin isolated from cultures of *Bacillus brevis* the former active against bacteria regardless of their staining properties and the latter against Gram positive organisms only have been tested by the author against cultures of protozoa and spirochaetes. Tyrocidine in concentrations of 50 γ per cc markedly inhibits growth of *Leishmania tropica*, *Trypanosoma cruzi* and *T. lewisi* but not that of either *Leptospira icterohaemorrhagiae* or *Bartonella bacilliformis*. Gramicidin in concentration of 10 γ in conformity with its failure to affect Gram negative bacteria had no action on the Gram negative protozoa spirochaetes or bartonella. Tyrothricin (which contains both gramicidin and tyrocidine) killed *Trichomonas agilis* in cultures and was effective in bringing about a temporary eradication of the flagellate in vivo. When relapse occurred it was ineffective against the relapse flagellates. It is probable that the effective substance in the tyrothricin was the tyrocidine since gramicidin is not known to affect flagellates adversely. C M Henson

TAYLOR H L HENSCHEL A F & ELLIS A Cardiovascular Adjustments of Man in Rest and Work during Exposure to Dry Heat *Amer J Physiol* 1943 Aug 1 v 139 No 4 583-91 4 figs [14 refs; Summary appears also in *Bulletin of Hygiene*]

Those who are accustomed to high temperatures can do physical work in the heat with better regulation of body temperature than unacclimatized persons. Various workers have shown that a considerable measure of acclimatization is gained after exposure for relatively short periods but hitherto there has been little evidence as to the rate of acclimatization or as to the detailed mechanisms involved. In planning the investigation described in this paper the authors sought to ascertain (i) how quickly acclimatization is gained in the first few days of exposure (ii) how much individuals vary (iii) whether individual responses to heat can be predicted and (iv) the sequence of the adjustments involved in establishing acclimatization.

The subjects of the experiments were volunteer soldiers and male university students. All were free from major defects that might have

affected cardiovascular functions. Ages varied from 18 to 46 but most of the subjects were between 20 and 30 years old. The principal data relate to observations made on 43 subjects for an average of nearly 5 days per subject (202 subject days) and reference is also made to further data gained in experiments on 23 other subjects during 147 subject days. Thus the conclusions reached by the authors are based on a substantial mass of data.

Experimental conditions were rigidly controlled. During the hot periods the temperature was maintained at 120 F dry bulb and 85 F wet bulb (92 F effective temperature) by day while by night the temperatures were 85 F dry bulb and 65 F wet bulb (effective temperature 74 F). The control period temperature was the same as the night temperature during the hot period. The transition from night to day temperature during the hot period took $2\frac{1}{2}$ hours (110 F was reached in the first hour) but the evening change was more rapid. There were regular work periods each morning and afternoon the work consisted of marching on a treadmill at $3\frac{1}{4}$ miles per hour with an angle of climb of $7\frac{1}{2}$ per cent (the oxygen consumption incurred by this work was about 7 times the basal rate).

Observations were made of pulse rates when at rest and when working, rectal temperature, rate of sweating, cardiovascular postural adjustment tests and cold pressor tests. Postural circulatory adjustment was studied by means of the Crampton test in which the pulse and blood pressure responses to elevation on a tilting table are used. The cold pressor test required the measurement of pulse and blood pressure before, during and after a 60 second immersion of the left hand in ice water. Rate of sweating was measured during specified work periods and the 24 hour sweat volume was also estimated. Diet was kept constant and water was allowed *ad lib*.

During the first days in the heat the working pulse rates, rectal temperatures and Crampton scores differed substantially from those observed in the control tests. Improvement in these responses took place rapidly and was complete in four to five days. Between the fifth and eighth days no significant change in these variables occurred.

It is concluded that the primary adjustment in acclimatization is an improvement in cardiovascular efficiency—a decrease in the accumulation of heat—as indicated by the rectal temperature during work, is probably secondary to this circulatory improvement.

Acclimatization does not appear to affect the daily sweat loss but the rate of sweating during work tends to increase as acclimatization proceeds. This change in the rate of sweating takes place to a large extent after the more important adjustments indicated by rectal temperature and pulse rate during work have occurred.

Out of the 66 men studied in this research 10 suffered heat exhaustion to a degree that required interruption of the work schedule. Four of these were clear cut cases of heat prostration with low resting blood pressure, rapid pulse, nausea, vomiting and vertigo. Of these four cases three occurred on the second day in the heat and one on the third day. All the ten victims recovered without being removed from the heat—rest was sufficient treatment—and all except one resumed the work tests within 24 to 30 hours. Failure of the working pulse rate to show improvement over that of the first day in the heat is a sign of impending heat exhaustion and poor cardiovascular postural adjustment in the evening is another danger sign.

is the appendix in which well tried methods for collecting and preserving insects are described

The reviewer has only one serious criticism to offer. The index is quite inadequate to the scope of the work, particularly when it is remembered that the majority of the users will be unacquainted with many of the scientific terms employed.

That a book so well produced and so magnificently illustrated (there are no less than 178 text figures and 13 plates, three of them in colour) can be produced in this country in war time is highly gratifying and the price of 15s is surprisingly low.

Dr Smart and his collaborators are to be congratulated on having written a text book which supplies a long felt want and which will prove invaluable to all medical men serving their country overseas.

R. M. Gordon

TROPICAL DISEASES BULLETIN

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CUTANEOUS LEISHMANIASIS

(CRITICAL REVIEW OF RECENT RUSSIAN WORK)

By CECIL A HOAPE D Sc

(Wellcome Bureau of Scientific Research London)

Cutaneous leishmaniasis is of considerable importance in the sub tropical parts of the Soviet Union where the disease is endemic with a high case incidence. In these regions there also occur epidemic outbreaks especially among groups of newcomers such as government officials agricultural labourers and soldiers. Towards the end of the last century during the Turkestan campaign up to 100 per cent of the troops were affected while during the last world war the incidence among the Russian troops in Asia reached 70 per cent. Thus apart from its general importance cutaneous leishmaniasis in Russia has always been a military problem as well. At present when considerable Soviet forces are concentrated in Central Asia the danger of cutaneous leishmaniasis spreading among the troops is again causing some concern.

Although investigations of oriental sore by Russian workers (including the original discovery of the causative organism see this *Bulletin* 1938 v 35 876) go back to the last century some of the most outstanding observations have been carried out in recent years. The present position regarding this disease in the Soviet Union was discussed at the *First Conference on Cutaneous Leishmaniasis* held at Ashkhabad in 1940. The conference dealt with the aetiology epidemiology and clinical aspects of the disease as well as with its transmission and control. The conclusions arrived at by the Conference were to serve as a basis for practical measures in combating the disease.

The present review is based in the first place on a symposium of works submitted to the Conference and published under the general title *Problems of Cutaneous Leishmaniasis* (1941) secondly on a pamphlet by KOJEVNIKOV (1942 b) giving a popular exposition of the disease in all its aspects and finally on a series of papers which have appeared in various Russian periodicals during the last few years. The findings of the Russian workers are of general interest for they throw light on a number of problems concerning cutaneous leishmaniasis in different parts of the world which have hitherto remained unsolved.

Distribution

Cutaneous leishmaniasis has a wide distribution in the subtropical regions of the Soviet Union (PETROV 1938 KOJEVNIKOV 1941 a GITELSON 1941 POPOV 1941 KOLESNIKOV & DJAFAROV 1941 KOUZIAKINE 1941 MIRZAYAN 1941 SHAGALOV 1942). It is endemic over a large area in Asia bordering with Afghanistan and Persia and in the Caucasus.

In Middle Asia (former Russian Turkestan) the disease is prevalent both in small settlements or villages and in towns. In rural districts it occurs mainly along the valleys of the rivers Atrek, Tedjen, Murgab, Amu Daria, Kakhkha Daria, Zeravshan, Syr Daria, also in the irrigated oases of the Turkoman desert and on the isle Tcherek (Caspian Sea). The most important urban endemic foci are the following towns: Takhta Bazar, Serakhs, Tedjen, Merv, Ashkhabad, Tchardjou, Herk, Bosaga (in Turkmenistan), Termez, Khorezm, Old Bokhara, Bekh Bud, Katta Kurgan, Samarkand, Fergana, Andijan, Kokand (in Uzbekistan), Khodjent (in Tadzhikistan). In the Caucasus cutaneous leishmaniasis is found in the Transcaucasian republics of Azerbaidjan (Baku, Kirovobad, Lenkoran, Gandzha, Barda), Georgia (Gori) and Armenia. Formerly the disease extended further to the west and was endemic in the Crimea, but at present this peninsula appears to be exempt. From time to time new foci have arisen (e.g. in Baku and Gori) to disappear again temporarily or for good (as in Tashkent).

Clinical Aspects

Since the end of the last century Russian physicians have recognized the existence in Turkestan of two clinical forms of cutaneous leishmaniasis, which the majority were inclined to regard as variants of the same disease connected by transitional forms. The various clinical manifestations were attributed to differences in the individual reactions of the human host. However, this interpretation failed to provide a satisfactory solution to a number of questions. The whole problem has been thoroughly re-investigated during the last decade and it has now been established that in Middle Asia (and probably elsewhere) oriental sore in man is represented by two distinct clinical types which are independent nosological entities. One is the so called *dry* type which is prevalent in towns and in which the papules persist for months before they ulcerate, the course of the disease being chronic. The other is known as the *moist* type; it occurs in the open country, its lesions ulcerate in about a week or two while the disease runs an acute course. KOJEVNIKOV (1941 b) defines the two types as *Leishmaniosis tarda exulcerans* and *Leishmaniosis cito (sua) retroicans* respectively. However, already at the Conference these terms have been criticized as being incorrect and misleading. Since they are also incomplete, the following amended definitions might be more appropriate: (1) *Leishmaniosis cutanea tarda exulcerans* for the dry type and (2) *Leishmaniosis cutanea cito exulcerans* for the moist type.

The differential characteristics of the two types are brought together in the accompanying table (compiled from the papers by KOJEVNIKOV 1941 b, 1942 b, LATISHEV & KRIUKOVA 1942).

Characteristics of the Two Types of Cutaneous Leishmaniasis

	1	2
Definition	Dry type with late ulceration <i>Leishmaniasis cutanea tarda exulcerans</i>	Moist type with early ulceration <i>Leishmaniasis cutanea cito exulcerans</i>
Synonyms (Russian)	Ashkhabad or Kokand sore chronic papular form Godovik (=annual)	Pendeher or Sart sore acute ecchymatous ulcerating form
Incubation Period	Long (2-6-12 months)	Short (1-6 weeks)
Course of Disease	Chronic unbroken dry papules persisting several months ulceration retarded Duration up to 12 months (or longer)	Acute moist lesions ulcerating rapidly (in 5-10 days) Duration less than 6 months
Lymphangitis	Rare (10%)	Common (70%)
Parasites in lesions	Numerous	Scanty
Virulence for mice	Low	High
Distribution	Mainly in towns (=urban type)	Mainly in open (desert) country (=rural type)
Seasonal occurrence	Perennial	Aestivo-autumnal
Reservoir Hosts	Not known (possibly domestic rodents)	Wild rodents (chiefly gerbils)

There is no mention of the occurrence of mucocutaneous leishmaniasis in Middle Asia.

The independent nature of the dry and moist forms is further supported by the following observations. (1) KOJEVNIKOV (1942 a) records 15 cases of spontaneous oriental sore in which lesions of both types were co-existent in the same individual. He also observed cases in which persons who had been successfully vaccinated with sores of the dry type subsequently acquired a natural infection (superinfection) with sores of the moist type. In all these instances there was a combined infection with the two types of oriental sore each running its own characteristic clinical course. It was thus demonstrated that infection with or recovery from one type of cutaneous leishmaniasis does not confer immunity against the other type. In other words there is no cross immunity between the two types which are therefore immunologically distinct. (2) It has also been demonstrated that in experimental infections from man to man with sores of either type the course of the disease in the recipient invariably corresponded to that in the donor (LATYSHEV & KRIUKOVA 1942). Similarly the inoculation of pure cultures provoked in man lesions which had the pathogenic characteristics of the strain of parasites used in the experiment (KOJEVNIKOV 1941 b). These observations show that the two forms of oriental sore remain true to type after transmission.

KOJEVNIKOV (1941 c) also describes some interesting observations on latent forms of cutaneous leishmaniasis. In the course of mass vaccinations (670 persons) with living parasites it was found that among

persons in whom the vaccine had apparently not taken the number of subsequent natural infections with oriental sore was comparable to that in the successfully vaccinated group and was half of that in the control group. The development of a partial immunity in the first group would seem to point to the presence of an inapparent infection. Further it was noted that 19 out of 36 persons who had been living in an endemic area (Ashkhabad) for more than five years but had never suffered from cutaneous leishmaniasis gave a positive allergic skin reaction to leishmania vaccine. In view of the high specificity of this test (*vide infra*) and the fact that the lesions had they been present could not have been overlooked it is concluded that the majority of these persons had had inapparent infections in the past. In a number of other patients with healed oriental sores the scars still showed signs of a mild active process (hyperaemia oedematous swelling focal infiltration). Such cases are thought to be instances of a protracted infection. [Similar cases have recently been described by BERLIN from Palestine (see this Bulletin 1940 \ 37 777)] ISSAYEV (1941) points out that in Bokhara latent cutaneous leishmaniasis also occurs in do

Pathology

The histopathology of chronic and acute cutaneous leishmaniasis according to KAPINA (1941) is characterized by the development in the dermal layer of the skin of infiltrations consisting of epithelioid and lymphoid elements with numerous leishmania inside and outside the macrophages. At the stage of complete ulceration the parasites disappear from the infiltration while destructive and degenerative processes become predominant. The blood vessels in the affected area undergo inflammatory changes. From the histopathological point of view acute and chronic forms of oriental sore are said to differ in the degree of development of the inflammatory process and the difference between them is quantitative rather than qualitative.

KOLEVNIKOV & DJAFAROV (1941) note that in secondary lesions appearing later the infiltration has a tuberculous structure with few or no parasites. This structure is regarded as a manifestation of an allergic reaction on the part of the host appearing at a certain phase of development of immunity. IGUCHINE & TSCHERNIAK (1941) describe the typical changes taking place in the capillary system of the papular lesion in the most type of cutaneous leishmaniasis. The capillary loops become dilated their meshes are broader than usual and there always develop a dense anastomosing subpapillary network. These changes are restricted to the area covered by the papule and they disappear as the lesion heals.

Diagnostics

DOUBOVSKOY (1941) describes an allergic skin reaction which can be employed as an auxiliary diagnostic method for cutaneous leishmaniasis. A vaccine prepared from cultures in a milk medium (described by DOBOVSKOY 1939 1942) is injected intradermally into the arm the dose being 0.1 cc containing 100 000 parasites. In a positive reaction there appears at the site of injection a swelling which disappears within the first hour. After 8-15 hours there develops a reddish

spot which gradually increases in size and is raised above the surface of the skin. The reaction reaches its full development by the end of 48 hours after which it subsides.

This reaction was tested on 442 persons. It was positive in 93.2 per cent of a group of 220 persons with established sores and in 93.7 per cent of a group of 74 who had recovered from oriental sore while among 148 persons who had never suffered from cutaneous leishmaniasis or who denied any previous infection the reaction was negative in 87.2 per cent. In the case of the 19 (12.8 per cent) positively reacting persons in the last group—all of them inhabitants of an endemic area—there was reason to suspect an undetected infection in the past (see p. 334). A positive reaction can be obtained beginning after the second month of the infection and in the course of many years afterwards. The test proved to be highly specific.

IGUCHI & TSCHERNIAI (see p. 334) advocate capillaroscopy as a subsidiary method for the diagnosis of oriental sore.

Vaccination and Immunity

The questions of vaccination and immunity are closely connected for the effectiveness of the former as a prophylactic measure depends upon the degree of protection it confers.

SOKOLOVA (1940, 1941) describes the results of large scale vaccination using material from both types of lesions (dry and moist). The inoculations were made directly from human lesions or with living cultures. The incubation period varied from 1 fortnight to a year (average 4-5 months) while the infection lasted from 2 to 17 months (average 6-9 months). The total number of persons vaccinated (up to 1939) was 1,522 of whom 1,107 were followed up. The vaccination was successful in 73.8 per cent the best results—100 per cent positive—being obtained with cultures of parasites from sores of the moist type whereas those from dry lesions were positive in 70.3 per cent. The effectiveness of vaccination in protecting against new infections (natural and induced) is shown by the following figures. Among 772 successfully vaccinated persons only 6.3 per cent subsequently contracted the natural disease while in unsuccessfully vaccinated persons natural infections were acquired by 29.3 per cent. These figures are compared with the incidence of cutaneous leishmaniasis among the non vaccinated population of Ashkhabad where the examination of 862 persons revealed 548 (63.6 per cent) infected cases. Further observations were made on several hundred inhabitants of the same town who had been vaccinated late in the season (November-December). Of these 26.7 per cent became naturally infected while among controls living under identical conditions the incidence of fresh infections amounted to 51.3 per cent.

The course of development of immunity following vaccination was investigated in 61 persons by re-inoculating them at different intervals from the time of the appearance of the primary sore. The results were positive in 27 cases (44.3 per cent). It was found that as a rule superinfection invariably succeeded 3-4 months after the primary infection but subsequently failures became increasingly frequent until after one year no reinfection could be produced. That superinfection is possible while the primary lesion is still present has been demonstrated recently by SENEKJI & BEATTIE [see this *Bulletin* 1941 v. 38 576].

All superinfections (both experimental and natural) have a milder and shorter course with a shorter incubation period and fewer lesions.

It is thus seen that in cutaneous leishmaniasis the development of immunity as the result of vaccination is a slow and gradual process its full effect being reached only in about one year after the inoculation. This fact explains the susceptibility to superinfection in a certain proportion of vaccinated persons. On the other hand the resistance to reinfection observed among those who had been unsuccessfully vaccinated may be due to an inapparent infection produced by the vaccine (see p. 334).

On the whole then vaccination would appear to convey absolute immunity only provided the disease is allowed to run its full course. However the amount of immunity acquired before the termination of the process is sufficient to reduce considerably the severity and duration of a superimposed infection. In view of this SOKOLOVA recommends the adoption of vaccination on a large scale as a prophylactic measure against cutaneous leishmaniasis.

The question of immunity is dealt with more fully by MOSHKOVSKY (1941-1942) who discusses the mechanism involved. As already mentioned a single infection with cutaneous leishmaniasis terminating in spontaneous recovery produces a stable immunity which affords complete protection against reinfection. However if the lesion is excised at an early stage immunity will not develop at all. The results of reinoculations in the course of a pre-existing infection depend upon the phase already reached by it. In the presence of an early sore the development of the new lesion is normal differing little from that in primary infections whereas in later stages of the disease the development of the secondary lesion is retarded and it may be aborted or the lesions may undergo degeneration. The symptoms of the secondary infection (superinfection) will be the less pronounced the nearer the original one approaches recovery.

These facts are interpreted on the basis of the principle of reinoculation which according to MOSHKOVSKY (1934) operates in the type of immunity which is acquired in chronic infections and is also known as premunition. SERGENT believes that premunition is governed by his law of precedence (*loi de prééance*) according to which homologous parasites when introduced into a host with a pre-existing infection are unable to compete with the original parasites with the result that the latter remain in occupation while the former are eliminated. However MOSHKOVSKY rejects this interpretation. By using marked strains of avian malaria parasites (i.e. strains possessing certain recognizable peculiarities) he and his collaborators claim to have demonstrated that in the course of a superinfection the inoculated homologous parasites are not destroyed but become established in the host the new infection being superimposed on the old one. The host's reaction to the newly introduced parasites is the same as its reaction to those already present in its body at the given phase of the disease and is determined by the degree of immunity already acquired. The superimposed and original infections become concomitant the former soon reaching the clinical phase attained by the latter and both terminating at the same time. This phenomenon was found to be the general rule in various infectious diseases (e.g. syphilis and malaria human simian and avian) and it has now been shown to occur in cutaneous leishmaniasis.

MOSHKOVSKI then considers the bearing of his principle on the practice of preventive vaccination in oriental sore. In the light of the facts noted above the problem resolves itself into determining the time required for the induced lesion to run its full course. Since this varies with the human host the locality and the strain of parasites vaccination should be timed to bring about the final phase of the disease (scar formation) before the advent of the epidemic season.

Treatment

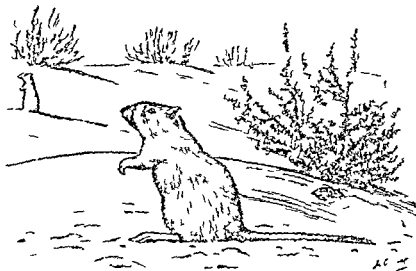
In Middle Asia atebryn has been employed in the treatment of cutaneous leishmaniasis with good results [see also FLARER this *Bulletin* 1939 v 36 454]. The method which is described in detail by DOBROTVORSKAIA (1941) varies according to the type and age of the lesions. In the dry type the early papule can be destroyed by infiltration with 5 per cent solution of acriquine (atebrin) injected at several points. In the ulcerating phase the sore is treated by infiltration with up to 10 cc of 3 per cent solution of acriquine or by application of 10 per cent acriquine ointment as well as with rivanol and protargol ointments. In the case of the moist type in the necrotic phase the lesion is treated by acriquine infiltration and by application of yatren or rivanol poultices. It is admitted that none of these methods produces a 100 per cent cure though there is considerable improvement in all cases.

BOBROV (1942) advocates the application of blood dressings in the treatment of sores of the moist type. The ulcers heal after 5-6 dressings applied in the course of 2-3 weeks. The total amount of blood required (and taken from the patient) varies from 50 to 100 cc. DUBOVSKOY (1942) reports successful results with vaccine therapy using a vaccine made with killed cultures. The course consists of up to 20 intradermal injections which produced a complete cure in 57.9 per cent of cases treated. Promising results have also been obtained in the treatment of oriental sore with the fruit juice of a plant of the genus *Maclura* (Moraceae) (GOUSSEV 1941) by transfusion of immune and normal blood (SCHOLEPINA 1941) and with X rays (SMIRNOV & TSCHERNIAK 1941).

Epidemiology

The most notable contribution to our knowledge of cutaneous leishmaniasis made by Russian workers was the demonstration that this disease is a typical zoonosis i.e. it is essentially a disease of lower mammals which is communicable to man. The history of these investigations most of which were carried out by LATYSHEV & KRUKOVA (1941a, 1941b, 1941d) also in Rept VIEV (1940) is very instructive. In Middle Asia the endemic foci of the moist type of oriental sore are represented chiefly by rural settlements adjoining the desert where the incidence of the disease among human beings is very high as compared with that in cultivated areas and in urban districts. It was established that in the desert sandflies breed exclusively in the burrows of wild rodents (gerbils and sousliks). An examination of large numbers of wild sandflies revealed infections with leptomastix flagellates in 3.5 per cent of the females caught in the open and in from 6 to 35 per cent of the insects recovered from the burrows of wild rodents the

species concerned being *Phlebotomus papatasi* and *P. caucasicus*. There was therefore no doubt that the sandflies acquired their infection from some animals in the burrows and suspicion naturally fell on the rodents to which the burrows belonged. This suspicion was fully



The Gbil *Rhombomys opimus* Reserv. r. host of Cutaneous Leishmaniasis (After PAVLOVSKY 1934)

justified for in the first place when inoculated from man 100 per cent of the gerbils proved to be susceptible to infection with *L. tropica* and secondly, an examination of more than a thousand wild rodents revealed natural infections with this leishmania in 30 per cent of the gerbils *Rhombomys opimus* (see text fig.) and in a small proportion of the gerbils *Meriones erythrorus*, *M. meridianus* and *Spermophilopsis leptodactylus*. Most of the positive animals had sores on the ears and the infection in them lasted up to six months. Natural infections among gerbils occurred not only near the endemic foci but also as far from human habitations.

The successful infection of sandflies after feeding on naturally infected gerbils provided further evidence (1) that these rodents were the source from which the sandflies acquired their infection and (2) that the leptomonads found naturally in sandflies represented the developmental stages of leishmanias. Finally the identity of the gerbil and human parasites was demonstrated by the experimental transmission of the infection from these rodents to man and by the susceptibility of the former to infection with the human parasite as already noted above.

It was thus proved conclusively that in the desert regions of Middle Asia a naturally infected wild rodent (especially gerbils) serves as reservoir hosts of cutaneous leishmaniasis which is transmitted to man by sandflies breeding in the burrows of these rodents. These facts also explain why the incidence of oriental sore is so high in isolated desert settlements as well as among persons working in uninhabited desert areas. The epidemiological rôle of the rodents is further enhanced by the fact that while outbreaks of the most oriental sore in man

are restricted to the aestival autumnal season among gerbils the infection rate remains at a uniform level throughout the whole year. This is due on the one hand to the long duration of the disease and the absence of immunity in gerbils (see p 340) and on the other to the fact that within the deep burrows the micro climate is stable all the year round and corresponds to a moist subtropical climate which provides the optimum conditions for sandflies. As a result the breeding of sandflies and the transmission of the infection to and from rodents is going on continuously in the burrows. This solves the question regarding the maintenance of the infection during interepidemic periods (LATYSHEV & KRIVKOVA 1941 b).

The foregoing data concern the epidemiology of the moist type of sore which is prevalent in rural settlements merging with the desert. They cannot be fully applied to the conditions affecting the dry sore which occurs in towns and cultivated oases. Thus practically nothing is known regarding the reservoir hosts of the urban form of oriental sore. SHAGALOV (1942) points out that in Ashkhabad cases of oriental sore are uniformly distributed throughout the township and not chiefly on the periphery where the desert rodents carrying leishmanias are found. The author suggests that the reservoir hosts in towns should be sought among domestic rodents. However LEVINSON (1941) who examined these animals was unable to detect any infected individuals among them though KRIVKOVA (1941) has shown that mole rats (*Nesokia* sp) and mice were susceptible to experimental infection with *L. tropica*. LEVINSON further records that 1 of 20 hedgehogs (*Hemiechinus albulus major*) had ear sores containing leishmanias. Since these animals live in burrows which also harbour sandflies it is possible that hedgehogs might represent a reservoir of human cutaneous leishmaniasis in towns. The question regarding natural cutaneous leishmaniasis of dogs and of their epidemiological rôle in Middle Asia is not yet clear and stands in need of further investigation (ISSAYEV 1941). The position is obscured because owing to the frequent occurrence of cutaneous manifestations of kala azar it is difficult to decide whether any particular skin lesions are due to cutaneous or visceral leishmaniasis unless the local epidemiological situation is known. Undoubted foci of canine cutaneous leishmaniasis are found in Old Bokhara where epidemics of the disease among human beings are accompanied by mass outbreaks among dogs. However in Samarkand oriental sore in dogs is a rare disease though cutaneous lesions are quite common in these animals.

The proved vectors of cutaneous leishmaniasis in Middle Asia are chiefly *Phlebotomus papatasi* and *P. caucasicus* (LATYSHEV & KRIVKOVA 1941 a). Since the latter species occurs mainly in wild nature and rarely attacks man while the former is essentially a domestic insect it is probable that *P. caucasicus* is mainly responsible for keeping up the infection among the rodents in their burrows whereas *P. papatasi* transmits the infection to man. This view is supported by the observation that the appearance of fresh human infections always coincides with the mass emergence of sandflies of the last named species.

Some interesting experiments were conducted to determine the range of flight of these two sandflies. It was found that the distance covered by them depends upon the character of the landscape. As a rule these insects do not fly beyond 1 500 metres (1 641 yards) over

flat country and considerably less when there are obstructions—such as hills water bush etc—in their way

Control

The knowledge obtained regarding the epidemiology of cutaneous leishmaniasis (moist type) pointed to the poisoning of the rodent burrows as the most promising method of combating this disease under desert condition since it would suffice to sever the links of the epidemiological chain (the rodent + sandfly) with one stroke.

The first experiment on the liquidation of a hyperendemic focus was accordingly undertaken in 1938 at Tashkepi in the Murab valley where 70 per cent of the population were affected with Pende sore (LATYSHEV & KRIVKOVA 1941 a 1941 c also in Rept VIEM 1940). A squad entrusted with the task poisoned over 500 000 burrows (using 3-4 gm chloropicrin per burrow) over an area of 1 250 hectares extending to a radius of 1 200 metres from the periphery of the built up zone. Already shortly afterwards there was a noticeable fall in the number of sand flies and in fresh cases of human infection. When the results of the campaign were assessed thirteen months later by a special commission it was found that sandflies had almost completely disappeared and only three fresh human cases could be detected the incidence of oriental sore having dropped from 70 per cent to 0.4 per cent. Thus the campaign not only succeeded in practically eradicating a hyperendemic focus of the disease but it also served to demonstrate the correctness of the epidemiological premises upon which the experiment was based.

Animal Experiments

Russian workers have also carried out a considerable number of experimental infections of lower mammals. In view of the discovery of reservoir hosts of the rural form of oriental sore among wild desert rodents the object of these investigations was to detect other susceptible hosts to ascertain whether any of them served as carriers of the urban disease and also to study the course of infection in the lower animals. Working with gerbils (genera *Rhombomys* and *Meriones*) mole rats (*Nesokia indica*) and domestic mice which were inoculated from human or gerbil sores as well as with cultures KRIVKOVA (1941) found that while parasites from moist sores produced infections in 100 per cent those from dry sores succeeded in only a single gerbil. In all positive cases localized lesions only were produced. The absence of a generalized infection in gerbils was demonstrated (1) by the negative results of feeding sandflies on parts of the skin devoid of lesions and (?) by negative heart blood cultures. On the other hand it is interesting to note here that infection could be readily produced in gerbils through the bites of sandflies (*P. papatasi*) thus confirming their rôle as vectors of oriental sore.

Unlike man the desert rodents (especially gerbils) do not acquire a sterilizing immunity after recovery from cutaneous leishmaniasis for they can be repeatedly reinfected. However the course of subsequent infections is usually milder than in the primary disease. The occurrence of reinfections or superinfections under natural conditions is evident from the fact that some of the captured gerbils had numerous cutaneous lesions in various phases of development. It was further

noted that the virulence of strains passaged for long periods of time through rodents without the intermediary vector was gradually reduced

White mice can be readily infected (and reinfected) with material from moist sores which produces a localized lesion at the site of dermal inoculation or implantation with a typical clinical course lasting from 3½ to 7 months (KOJEVNIKOV *et al* 1941). On rare occasions there was also evidence of the presence of leishmanias in the internal organs (liver and spleen) ISSAYEV (1941) notes that dogs acquire typical oriental sore when experimentally infected with *L. tropica* (see also p 339)

Cultivation

KRIVKOVA (1942) describes a simplified modification of the NNN medium in which fresh blood is substituted by the product of its digestion with pepsin and hydrochloric acid. The medium is prepared as follows. Physiological solution of saline 150 cc and chemically pure hydrochloric acid (S G 1.19) 6 cc are poured out into a 250 cc glass stoppered bottle. To this mixture are gradually added 50 cc of defibrinated blood (rabbit, sheep or human) the fluid being thoroughly agitated all the time. When the mixture has become black 1 gm pepsin is added to it after which the bottle is placed in a water bath at 50–55 C for 3–5 hours and shaken from time to time. The bottle is then kept in an incubator at 37 C for 1–2 days. In the foregoing process it is not necessary to take any aseptic precautions. After digestion is completed the mixture assumes a thick consistency. Finally it is neutralized with 20 per cent NaOH with phenol red and cresol red as indicators (the tests can be made by placing drops of the digest on strips of filter paper which have previously been soaked in the indicators and then dried). When the reaction is pH 7.0–7.2 0.5 cc of 0.25 per cent chloroform is added to the digest the container is closed with a glass stopper smeared with sterile vaseline and allowed to stand for 2–3 days. The digest is then distributed in ampoules in which it can be preserved for more than one year. For the preparation of the medium the test tubes with the hypotonic agar (1.5 cc per tube) are removed from the boiler and when their temperature is near 90 C about 0.5 cc of the digest is added to each tube after which the medium is sloped and allowed to cool. Since the condensation fluid tends to evaporate 0.5 cc sterile 1 per cent peptone solution can be added to each tube.

In this medium the leishmania grow readily (even in primary cultures of scanty parasites inoculated from gerbils) and are abundant by the fourth day. The use of stored digested blood simplifies the preparation of the NNN medium. Moreover the method is very economical for the digest can be made with blood offal.

DISCUSSION

In the foregoing account it is shown that the Russian workers have unravelled a number of problems concerning cutaneous leishmaniasis which have hitherto remained obscure. In the first place they have proved the existence of two nosologically independent types of oriental sore (in addition to the muco-cutaneous form) secondly they have elucidated the mechanism of immunity in this disease thirdly they have demonstrated that the reservoir hosts of the infection are wild

rodents living in burrows which they share with the sandfly vector and finally they have devised a successful biological method of control based on the interdependence of the human and rodent diseases.

The work carried out in Middle Asia has a direct bearing on the position in other countries both of the Old and the New Worlds where the existence of different clinical forms of cutaneous leishmaniasis has also been known for a long time. In describing cutaneous leishmaniasis of the Old World the text books usually give an account of the more common ulcerating oriental sore which is regarded as the typical form whereas the non ulcerating variant is considered as atypical. Thus LAVERAN (1917 p 340) describes under the heading *Formes anormales* non ulcerating sores which terminate in resolution with or without retarded ulceration. The two forms are regarded by some authors as phases of the same disease differing only in severity. If the literature on the subject is considered in the light of the Russian discoveries it will be evident that some of the clinical forms described by earlier observers are comparable to the two types present in Middle Asia.

In discussing his own observations KOJEVNIKOV (1941 b) suggests that both types of cutaneous leishmaniasis occur in Algeria the dry one in Tell and the moist one in Biskra. He also thinks that in Egypt the forms described by FERGUSON & RICHARDS (1910) as the errucous and granulomatous (flat) forms correspond to his moist and dry types respectively. Thus THOMSON & BALFOUR (1910) have described case of non ulcerating oriental sore from Khartoum which they named Leishman nodules and which had all the characteristics of the Russian dry type. In discussing the purely cutaneous infections in the Anglo-Egyptian Sudan KIRK (1942) also recognizes the existence of two clinical types. One is the ulcerating oriental sore which is the common form in that country and corresponds to the Russian moist type. The other is represented by the non ulcerating Leishman nodules described by THOMSON & BALFOUR but not encountered by KIRK himself. As noted above the latter form can be identified with the dry type. Instances of non ulcerating or dry sore in addition to the typical or moist oriental sore have also been reported from India (CARTER 1911) and from Greece (*vide* BRUMPT 1936). MANSOV (1917) stated that in Baghdad the disease sometimes recurs more than once in the same individual but as a rule the sores of the second attack do not break down. Since a single attack of oriental sore affords protection against reinfection with the homologous form but not against a heterologous sore it is probable that in these cases there was a primary infection with a moist sore followed by reinfection with a dry sore. MANSOV also notes that in some instances the initial papule does not ulcerate (= dry type).

The conditions in the New World appear to be very similar to those in the Old World. According to PEÑA CHANARRÍA (1937) in Costa Rica there occur two main clinical types of cutaneous leishmaniasis—ulcerating and non ulcerating—each with two variants. From his description it would seem that the non ulcerating nodular form (and possibly also his errucous form) is identical with the dry type while the ulcerating cutaneous form corresponds to the moist type or oriental sore *sensu stricto*. As regards the remaining Central American form *ulcerosa cutaneo-mucosa* this is similar to South

American espundia on the one hand and to the muco-cutaneous form found in the Anglo-Egyptian Sudan (KIRK 1942) on the other. As regards the aetiological basis for the differentiation of the clinical forms of cutaneous leishmaniasis some authors (e.g. PEÑA CHAVARRÍA) believe that environmental conditions under which the host lives determine the type of the disease produced while others (e.g. KIRK) think that the type of infection depends upon the strain of parasite involved. If the latter supposition is correct it would follow that different strains vary in virulence and in the degree of adaptation to the human host. The type of infection differing in their effect upon the host represent strains of *L. tropica* comparable to those occurring among other true biological races (cf HOARE 1943).

The question regarding reservoir hosts of oriental sore does not seem to have been dealt with outside Middle Asia. A search for carriers among the wild burrowing rodents in other endemic regions might therefore yield promising results. In this connexion it is interesting to note that it has been demonstrated that some North African wild rodents are susceptible to infection with leishmanias. Thus ARCHIBALD (1914) infected gerbils (*Gerbillus pygargus*) and jerboas (*Jerboa gordoni*) with a Sudanese strain of *L. donovani* while L AVERAN (1917) reported the successful infection of gerbils (*Meriones shawi* and *Gerbillus hirtipes*) with a Tunisian strain of *L. tropica*. Quite recently BLANC *et al* (1942 a, 1942 b) have experimentally infected the spiny squirrel (=ground squirrel) *Verus (Atlantoxerus) getulus* with *L. tropica* and *L. donovani* while NATTAN LARRIER *et al* (1940, 1942) infected the gerbil *Meriones shawi* with the last named parasite. It is significant that the environmental conditions and habits of these North African rodents are the same as those of the rodents which are proved carriers of oriental sore in Middle Asia and that the two groups of rodents are also closely related zoologically. However with the exception of L AVERAN none of the above mentioned observers has considered the bearing of these experiments upon the epidemiology of leishmaniasis. As regards L AVERAN he thought it was highly improbable that gerbils could serve as reservoir hosts of leishmaniasis since these animals have never been found naturally infected.

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for early cases. If the cerebrospinal cell count is over 80 however it is probably safer to use a pentavalent arsenical. In comment LORIE (who had introduced this group of drugs in the treatment of protozoal infections) pointed out the need for a longer period of observation before arriving at definite conclusions.

LOURIE (p 370) reports on a therapeutic trial of certain aromatic diamidines in *T. gambiense* infections in Sierra Leone. He concludes that in early cases the curative properties of pentamidine and propanil are no less than those of trypanarsamide whether the latter is given alone or preceded by antrypol. Stilbamidine is of considerably less value. In late cases trypanarsamide is much more effective than these diamidines. The toxic effects of the diamidines are immediate and the outstanding feature is the sudden and severe but transient fall in blood pressure which is accompanied by faintness and various subjective symptoms. No late toxic effects were seen but the author notes that other workers using heavier doses have reported late disturbances of a serious nature. The diamidines are given intravenously (except in a few cases when the intramuscular route was used) in doses of 20-100 mgm daily for 8-12 days for adults. To some patients they were given at 5-day intervals but there is advantage in daily administration.

GILBERT (p 589) has treated 14 cases of *T. gambiense* infection with pentamidine. He suggests that two courses of 8 injections one each day of at least 2.0 mgm per kgm body weight preferably intravenously separated by an interval of one week might be highly effective except in patients entering on coma.

FULTON and LORIE (p 19) have investigated the trypanocidal action of two more aromatic diamidines.

LOURIE (p 370) writes of the results of treatment of *T. gambiense* infections with antrypol and trypanarsamide. Various toxic effects are recorded and it is the opinion of the author that in the aetiology of these the poor nutritional state of the patients was an important factor. His incidence of toxic reactions with some deaths was seen in patients treated with antrypol followed by trypanarsamide all doses being given at intervals of five days. When a long interval of 5-7 weeks was allowed to elapse after the first or second dose the remission being given at 5-day intervals the toxic effects were much reduced. The toxic symptoms are set out in detail.

McDERMOTT *et al* (679) have investigated the relation in rats between nutritional degeneration of the optic nerve and trypanarsamide. Degeneration occurs in rats fed on a basic diet deficient in vitamin A or parts of the vitamin B complex whether trypanarsamide is given or not but is rather more marked in those given trypanarsamide. It seems probable that the parts of the vitamin B complex which protect the nerve are pantothenic acid and pyridoxine.

KING and STRANGEWAYS (p 20) have reported on the relation between chemical structure and drug resistance among certain arsenicals. The work was done *in vitro* with normal and trypanarsamide resistant *T. rhodesiense* but cannot be further abstracted.

ROSENTHAL (p 589) has shown that mapharsen is trypanocidal when given by mouth to mice infected with *T. equiperdum* and is resistant *T. rhodesiense* (to diminish toxicity) the chemotherapeutic index (max tol dose/curative dose) was considerably higher than when given intravenously.

DUBOIS and KOHN (p 294) show that methylene blue and certain other substances when injected into mice infected with trypanosomes interfere with the therapeutic action of subsequently injected neocarsphenamine

In an old but still active focus of sleeping sickness in the Belgian Congo where new cases in 1942 numbered 3 69 per cent of the population FAIN (p 373) administered to almost every member of the community a dose of Belganyl (the equivalent of Bayer 205) amounting to 0 025 gm per kgm body weight as a prophylactic These injections produced toxic effects some of which were by no means negligible in a proportion of cases The author describes the toxic effects which occurred within a few hours within a few days (the chief being albuminuria with or without casts and red cells) and later The prophylactic effect was measured by examination of the population at three monthly intervals up to nine months after injection 12 new cases were found (there had been 162 new cases in the previous year) It is concluded that the disadvantages of toxicity are compensated by the real advantage from the prophylactic effect in heavily infected communities

DUBOIS & KOHN (p 19) have tested the infectivity of *T. brucei* in animals after treatment with Bayer 205 and other drugs the infectivity was tested before the trypanosomes disappeared from the blood Bayer 205 rendered them non infective [as is well known] but arsenicals tartar emetic and human serum usually failed to do so In comment HAWKING points out that this is probably because the trypanosomes were tested for infectivity in the period between fixation of the drugs and actual death

Control

VAUCEL (p 586) traces the history of sleeping sickness in the French Cameroons The disease was recognized in 1899 but control on a large scale was not undertaken until 1920 In 1922 the incidence in a population of three quarters of a million was 17 2 per cent but in some areas the infection rate was much higher even up to 90 per cent Control has been attempted with great success by chemotherapy but the author notes that in some areas this medical treatment encountered resistance checks and revivals of infection which are apparently inexplicable He has received the impression that marked success is achieved in the spreading zones and checks are met in old endemic foci situated in swampy riverine areas infested with tsetse During the last 10 years the incidence of new cases has remained almost constant but at a low level and it appears to be impossible to progress further by these means chemotherapy apparently cannot eradicate trypanosomiasis The explanation of this may be that certain races of tsetse may be especially effective or that there may be particularly virulent trypanosomes he thinks that drug resistance is probably not an important factor The author advocates stronger administrative measures and discusses the breaking of contact between man and fly by settlement of the people and destruction of tsetse the economic and social development of the country must be raised as part of the trypanosomiasis control scheme

MURAZ (p 524) discusses the results achieved in French West Africa by a control scheme in which medical supervision and treatment were supplemented by agricultural measures (bush clearing followed by

cultivation) This programme gave results much better than those which followed chemotherapy and chemoprophylaxis alone [The details were discussed in previous papers which have not however been received]

LEWIS (pp 293-294) discusses the relation between tsetse and land development in Kenya. Fly infestation is irregular but most species depend on water so that the infested areas are along the river or near water holes. Animal trypanosomiasis has led to concentration of stock in clear areas and control of other diseases has effected an increase of stock with overcrowding and consequent soil erosion. Spread of the fly may occur along traffic routes and for control these should be arranged so as to avoid spread as far as possible. Watering places and road crossings should be kept free from fly dry season areas of fly concentration should be attacked by trapping of flies and destruction of wild animals should be carried out. By controlled cultivation more land can be brought into use and can be freed from fly so that stock can be reintroduced.

LEWIS (p 678) notes that in Kenya the ruthless clearing of bush is no longer regarded as too drastic and costly, a means of controlling tsetse and that the clearing of barriers is sufficient to prevent extension and can be used to isolate blocks of infested country in which the tsetse can be dealt with by other methods. Game reduction very satisfactory in S Rhodesia may not be so effective against species which are not so well adapted to game as is *G. morsitans*.

MACAULAY (p 885) gives an account of a tsetse fly and trypanosomiasis survey of Bechuanaland which was carried out in 1940-42. The survey was concerned chiefly with trypanosomiasis of cattle but the investigations into the biology of the only vector found *Glossina morsitans* are important in relation to human sleeping sickness which also occurs in the area. Catches of *G. morsitans* were always highest where the vegetation was thickest especially in thicket with canopy. Breeding takes place in the forest fringes. Destruction of thicket leads to desiccation and are unsuitable to the fly. Destruction of breeding areas (which can be defined by aerial photography) was undertaken by cutting small trees and low branches and by burning when they were dry. The results were good. The fly population did not appear to be related to rainfall or to maximum minimum or mean temperature. The vegetation fringes to swamps in which the humidity is adequate provide the shelter necessary to the fly and game is becoming more abundant. The control measures recommended include the selection of grazing grounds and their maintenance the settling of families along the edge of all danger areas the exclusion of game by the erection of thorn bush fences thicket control the use of traps and clearing work. Human sleeping sickness has broken out again in one area and it is advised that a sleeping sickness patrol be established that the inhabitants of certain villages be transferred to fly free areas and that bush clearing be carried out.

CHORLEY (p 588) shows that native cattle have continued to increase in the areas of Southern Rhodesia rendered free of tsetse and that during 1941 over 100,000 game animals were destroyed as part of the control programme. The position in the restocked areas appears to be satisfactory but there has been an extension of *G. morsitans* from Portuguese territory towards the Rhodesian border with resultant outbreaks of cattle trypanosomiasis.

CHAGAS'S DISEASE

Epidemiology Transmission

DAVIS *et al* (p 590) have proved that *Triatoma sanguisuga* and *T. ambigua* are natural carriers of *Trypanosoma cruzi* in Texas a list of the other six proved vectors in that State is given PICKCHANIAN (p 526) has found certain animals—armadillo opossum mouse and wood rat—naturally infected with *T. cruzi* in Texas

WOOD (p 525) has determined that *T. cruzi* may be found viable in bugs as long as 15 days after the death of the bugs He notes that the rodents which harbour *T. cruzi* are all entomophagous and can probably become infected by eating dead infected bugs

TORREALBA (p 680) reports a very high incidence of Chagas's disease in part of Venezuela where *Rhodnius prolixus* is the vector He has found the horned Capuchin monkey (*Cebus apella*) infected in nature

OTÁLORA (p 759) reports that Chagas's disease is fairly common in Colombia especially in the poorer people He regards the xenodiagnostic test as the most reliable and states that it is not difficult to carry out

MAZZA (pp 525 761) and VIANA MARTINS and MACEDO (p 761) contribute information on various bugs found infected in Bolivia Although infected Triatomid bugs have been found in Bolivia human or mammalian disease has not hitherto been seen MAZZA and CHACON (p 888) have now found infection in one child and one dog and suspect that the distribution of the disease must be fairly wide

GASIC and CARVAJAL (p 760) describe the clinical findings in acute and chronic Chagas's disease The latter is difficult to diagnose but xenodiagnosis and the Machado reaction may help Incidence is high in Chile judged by the results of the Machado test in sera collected from large numbers of people but the disease appears to be less severe on the Pacific than on the Atlantic side of South America *Triatoma infestans* is the vector and the principal reservoirs are dogs and cats

GASIC (p 888) repeats the view that Chagas's disease appears to be milder in Chile than in the Atlantic countries of S America He describes the clinical types The infection has been found in dogs and cats but other animals examined have proved negative

Pathology Immunity Clinical Findings

COLLIER *et al* (p 21) have studied the phases of *T. cruzi* infection of mice After a negative blood phase there occurs progressive infection followed by the occurrence of acute pathological changes At this stage oedema is found over the body and along fascial planes The exudate from this oedema may contain more trypanosomes than the peripheral blood A detailed description of the oedema is given and it is noted that it may spread through and separate the voluntary muscle fibres and that the myocardium may show similar changes The thyroid remains normal In mice which showed the acute pathological changes the leishmanial forms of the parasite could be found in heart and other organs but not in the thyroid The oedema therefore is not myxoedematous but is probably inflammatory Subsequently in mice which survive the oedema disappears and the blood infection fades Oedema does not occur in other trypanosomal infections of mice nor in animals other than man dog and mouse infected by *T. cruzi*

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SENEBJI (p. 681) has immunized rabbits by injection of killed culture forms followed by injections of living trypanosomes. Aglutinins and lysins for *T. cru.* were demonstrated in the serum of these animals and intradermal injection of cultures produced in them reactions which reached their maximum in 24 hours. The author concludes that the slide agglutination test affords a simple method for the diagnosis of experimental *T. cru.* infections in animals.

DENISON (p. 681) has demonstrated that serum of rats which have recovered from *T. cru.* infection will lyse culture forms of the trypanosome. Serum from uninfected animals in which the reticulo-endothelial system has been blocked with trypan blue also causes lysis but much more slowly.

MAZZA *et al.* (p. 226) reports that early diagnosis of Chagas's disease leishmania forms of *T. cru.* can be found. Adenitis is associated with three stages of the disease local to the site of primary infection (inoculation chagoma), satellite lymphatic dissemination around the primary lesion (metastatic chagomata), generalization (haematogenous chagomata). The authors describe the histological findings and finally in glands elsewhere after generalization of the infection and finally in glands elsewhere after generalization of the infection.

VERSANI and JUNQUEIRA (p. 890) support the classification and state that if blood examination is negative biopsy of enlarged glands provides the readiest means of diagnosis of Chagas's disease. In the regional glands leishmania forms of the parasite may be found and the histological appearances are characteristic. Adenitis is seen first in the glands draining the area of infection then in satellite glands and finally in glands elsewhere after generalization of the infection.

IRIARTE (p. 375) has had disappointing results in Chagas's disease with attempts at diagnosis. He states that the latter is a group test with Machado-Guerreiro test. He also describes the preparation of an antigen from *T. cru.* for use in a complement fixation test in Chagas's disease.

DAVIS (p. 890) describes the preparation of an antigen from *T. cru.* for use in a complement fixation test in Chagas's disease. ALVAYAL and CARVAJAL (p. 761) have described the cardiac abnormalities which may be found in Chagas's disease. The paper cannot satisfactorily be abstracted but sinus arrhythmia, arrhythmia with tachycardia, tachycardia of sinus origin and bradycardia are mentioned.

MAZZA *et al.* (p. 22) describe the action of the two Bayer preparations known as 7609 (Ac) and 9736 (As) in cases of Chagas's disease. The former is more effective but more toxic. Charles Wilcocks

MALARIA

MAZZEO M. & SEMENTINI A. Endemia malarica ed anofelismo in una località del Napoletano (Mondragone) [Endemic Malaria and Anophelism in a Neapolitan District (Mondragone)]. *Riv di Malariologia* Sez. I 1942 v. 21 153-76 [Translation of abstract by DIETERLEN from *Zent f. Bakt. I Abt.* Ref. 1943 June 18 v. 143 No. 15/16 309].

The authors report on the species and races of anophelines found in the town and district of Mondragone in the Province of Naples. *A. maculipennis* var. *mesasiatica* and *atroparvus* are the predominant species met with near dwellings and stables. In the swampy

districts a few *elutus* are found and here and there *labranchiae* in the spring and autumn *typicus* is met with. The authors discuss the present position and the sanitary construction work done and recall the severe malaria epidemics of former times. They show how the houses are protected today by a ring of stables well filled with oxen and how the hygienic conditions have greatly improved. They believe that the improvements already made and those still to be made will exert a further favourable influence.

J F Corson

PETAZZI A. L'endemia malarica a Durazzo nel 1941 [Endemic Malaria at Durazzo in 1941] *Riv di Malariologia* Sez I 1942 v 21 177-97 [Translation of abstract by DIETERLEN from *Zent f Bakt I Abt Ref* 1943 June 18 v 143 No 15/16 309]

After describing the antimalarial measures carried out in the area of Durazzo in 1941 the author reports on the work of the Malaria Station in Durazzo (a branch of the Malaria Institute E Marchiafava in Rome) during 1941. Besides the study of endemic malaria meteorological observations were made the occurrence of *Anopheles* studied and spleen indices determined. The presence of *A. elutus* (the most dangerous carrier) *A. maculipennis typicus* and *messeae* *A. bifurcatus* *A. super pictus* and *A. hyrcanus pseudopictus* was shown. Observations on endemic malaria have shown a large decrease in the number of cases compared with 1940. The decrease affected chiefly *P. falciparum* infections and was connected with increased salinity of the lagoon waters diminished rainfall and small numbers of labourers and soldiers living in Durazzo and the neighbourhood during 1941. The Albanians were infected with *P. falciparum* to a greater extent than the Italians.

J F Corson

COLUZZI A. L'endemia malarica a Valona. Nota II [Endemic Malaria at Valona] *Riv di Malariologia* Sez I 1942 v 21 198-214 [Translation of abstract by DIETERLEN from *Zent f Bakt I Abt Ref* 1943 June 18 v 143 No 15/16 309]

The seasonal epidemic of 1941 at Valona began in the middle of June and lasted until the end of October. The first cases of benign tertian appeared in the third week of June and the first cases of malignant tertian occurred in the first week of July. Compared with 1940 the infections have decreased in number by about 50 per cent. The spleen index has decreased by about 10 per cent. As already pointed out after the drying up of the swamps the springs and streams remain as breeding places of *Anopheles*. Larvae of *A. maculipennis typicus* and *A. elutus* were found. Besides the treatment of cases of malaria antimosquito measures—by Paris green oiling small sanitation works and drainage—are used measures which have certainly contributed to the decrease of malaria.

J F Corson

COLUZZI A. Osservazioni sulla malaria dell'Epiro (Grecia) [Observations on Malaria in Epirus (Greece)] *Riv di Malariologia* Sez I 1942 v 21 96-108 [Translation of abstract by DIETERLEN from *Zent f Bakt I Abt Ref* 1943 June 18 v 143 No 15/16 308]

After a short description of the geographical climatic and demographic features of Epirus the author reports on the epidemiological conditions

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were in November 1941. He records the spleen index of the chief places and from personal observations gives a general view of the malaria position in Epirus. Malaria is very widespread especially along the coast rivers and streams near the lakes and in the swampy areas up to 500 metres above sea level. The commonest malaria vectors are *A. elutus*, *A. superpictus* and *A. maculipennis*. The epidemic season extends from June to the end of October with local fluctuations according to the breeding of the anopheline carriers. All three forms of malarial infection *P. vivax*, *P. falciparum* and *P. malariae* are present. Blackwater fever is rare. There is urgent need to carry out antimalarial (antilarval) sanitary measures to treat the sick properly and promptly and to offer good protection to the traveller visiting the country.

J. F. Corson

PERVES M. Observations de paludisme héréditaire et congénital. Quelques considérations sur la croissance des nourrissons dans la tribu Maka (région du Haut Nyong, Cameroun). [Hereditary and Congenital Malaria. The Growth of Infants of the Maka Tribe in the Upper Nyong Region of the Cameroons.] *Reu. Sci. Méd. Pharm. et l. et del Afrique Française Libre* 1943 Mar 2 No 7 107-18 1 chart

The observations recorded in this paper were made in the Abong Mbanga subdivision of the Upper Nyong, region of the Cameroon. Abong Mbanga is an immense saucer shaped swampy wooded depression some 800 metres above sea level from which the large Nyong River takes its source. It has long been an extremely unhealthy region with a declining population. Twenty years ago trypanosomiasis was possibly the most potent cause of morbidity and death. Today malaria is public enemy number one though other conditions contribute to the decline of the population. Gonorrhoea is an important cause of sterility. Alcoholism, drug addiction, hereditary malaria, to be quite common. The author believes hereditary malaria to be quite common. Examination of four stillborn infants *P. falciparum* as found in the spleen of three and in the bone marrow of one. Only one of the four infants was free of malaria. In one of the positive cases rosettes and gametocytes were seen. The cause of death of the three infected infants as complicated or difficult labour.

A distinction is made between congenital and hereditary malaria the former being reserved for cases in which infection is transmitted from mother to infant at the time of birth as a result of placental damage. Among 661 infants examined soon after birth *P. falciparum* as found in the umbilical cord of 46 and in the finger blood of 17. Of 601 mothers examined *P. falciparum* as found in the finger blood of 211 and in the umbilical cord of 78. [The author does not suggest any explanation for the difference in the results of examination of the blood of the umbilical cord of infants and mothers respectively immediately after birth.] Each baby is supplied with an individual card on which are recorded monthly its weight, the results of blood examination and notes of any disease. A study of these cards indicates that under four months of age parasitaemia and splenic enlargement are both exceptional. From

the fourth to the sixth month one infant in three has an enlarged spleen and one in four harbours plasmodia. Thereafter both indices increase and remain at a very high level till 18 months of age after which there begins a slight diminution. The results show that 94 per cent of infants are infected with malaria. The rate of growth of infants is satisfactory up to the third month thereafter it lessens and is much below normal during the second six months of life.

Norman White

SIMMONS J S Global Malaria *New England J of Med* 1943
Oct 14 v 229 No 16 605-10 3 figs

The geographical distribution of malaria is briefly outlined and reference is made to the most important of the anopheline vectors in various parts of the world. A graph illustrates the annual admission and death rates for malaria in the United States Army from 1819 to 1941. This shows the remarkable decline in incidence of malaria since 1900. In 1939 the malaria admission rate for the army at home and abroad was only 3.8 per thousand. In 1940 the malaria control programme was greatly expanded. An enormous mosquito control programme was carried out in the United States in 1941 at the cost of 2 million dollars. The malaria admission rate in that year fell to 1.7 per 1 000. In 1942 the campaign was intensified 3 million dollars being spent. The malaria rate in that year fell to 0.6 per 1 000 much the lowest rate ever recorded. U.S. troops are operating in some very malarious areas but in no theatre of war was the admission rate in 1942 above 173 per 1 000 and it is believed that even in these areas the situation will improve with the more extensive field use of the new insecticides and repellents. Generally speaking the health of U.S. soldiers everywhere had been excellent.

Incidentally the author issues a warning against the misleading and false rumours derogatory to atabrine that have been circulated. The Army was glad that it had adequate supplies of that drug.

Norman White

SISK W N Post War Malaria Prevention by the County Health
Department *Amer J Pub Health* 1943 Nov v 33 No 11
1343-6

The author who is the Medical Director of the Buncombe Board of Health Asheville N.C. has already had 42 cases of malaria among troops invalided to military hospitals in his County. This part of North Carolina is not malarious though 10 cases are known to have been contracted locally several years ago. *A. quadrimaculatus* breeds in creeks and lakes near the largest of the Army hospitals. An anopheline survey has been undertaken. The Anopheles breeding season is limited from the latter half of June to the end of September. Oiling and varying the water level of small lakes are among the measures used to control mosquito breeding. In view of the certainty of the importation of malaria among returning troops during and after the war to all parts of the United States it is expedient that all health authorities should carry out surveys to determine the malaria transmission potentialities of their district. In doing so expert help and guidance can be obtained from the U.S. Public Health Service.

Norman White

RUSSELL P F Malaria and its Influence on World Health *Bull New York Acad Med* 1943 Sept v 19 No 9 599-630 [40 refs]

This is the Hermann M Biggs Memorial Lecture. A summary is impossible for the lecture gives in relatively small space a remarkably complete history of malaria from early times up to date. The story is well told. It ends in directing attention to the fact that in spite of potent weapon for treatment and control malaria remains uncontrolled over large stretches of the earth's surface. Malaria control is still a feeble effort.
Norman White

SAGEL W Beiträ zur Beantwortung der Frage nach der E Stadium Sporozoitentheorie der Malaria mit Hilfe von biologischen Leukozytenkurven und von Hämoogramm Analysen (The Leucocyte Curve and Haemogram in relation to the Endothelial Stage of Malaria Parasites) *Deut Tropenmed Ztschr* 1943 Aug 1 v 47 No 15/16 377-99 7 figs

The author describes observations he has made on the leucocytes of patients with mental disease who had been treated by induced malaria. He finds that the blood changes of cases in which the malaria was produced by mosquito bites differ from those of cases resulting from the inoculation of infected blood. He claims that soon after the injection of sporozoites by the mosquito the blood picture shows a monocytosis which does not occur in inoculative malaria. This difference is due to a stimulation of the reticulo-endothelial cells by the sporozoites. The author's conclusion supported by numerous tables and charts and much detailed discussion is that there is justification for the assumption that in human malaria sporozoites enter cells of the reticulo-endothelial system and there give rise to an exoerythrocytic phase of development.
C M Wenyon

VARGAS L El Grupo *maculipennis* del nuevo mundo y el *Anopheles earlei* (The *maculipennis* Group of the New World and *A earlei*) *Rev Inst Salubridad y Enfermedades Trop Mexico* 1943 Sept v 4 No 3 279-84 4 figs English summary

Anopheles of the New World belong to the so-called *maculipennis* group are *atropos* Dyar & Knab 1906 *arcticus* Hoffmann 1935 *earlei* Vargas 1943 *freeborni* Aitken 1935 *occidentalis* Dyer & Knab 1906 *quadrimaculatus* Say 1874 and *walkeri* Theobald 1901. They must be dealt with as species discarding the specific name *maculipennis* as it does not include *atropos* *walkeri* *quadrimaculatus* and *earlei*. We lack enough information on the components of the group but especially on *occidentalis* and *earlei*. The author presents some characters of larvae pupa females and male terminaliae. Some data on other *Anopheles* are mentioned.

VARGAS L Clave para identificar las larvas de *Anopheles* mexicano [Key to the Mexican Anophelines] *Conc Mexic* 1940 Apr 1 v 1 No 2 66-8

PRATT H D The Identification of First Stage Larvae of Puerto Rican *Anopheles* *Pub Health Rep Wash* 1943 Nov 19 58 No 47 1715-17 1 fig

ALVAREZ ALEMÁN (Leopoldo) Lesiones histopatológicas del cerebro y el cerebelo en el paludismo pernicioso. Ensayo patológico [Histopathology of the Cerebrum and Cerebellum in Pernicious Malaria] Mem d V Congr Méd Centro americano San Salvador 5-12 Nov 1938 pp 379-393 With 14 figs

- 1 HUGHES S B & BOMFORD R R Clinical Features and Treatment of Malaria in British Troops in West Africa *Brit Med J* 1944 Jan 15 69-73 [18 refs]
- 11 BRITISH MED J 1944 Jan 15 84-5 Malaria among Troops in West Africa

1 This admirable account of the clinical features of malaria in West Africa is based on over 1 200 cases seen in two military hospitals. The patients were white males aged 18 to 51 who had been passed fit for overseas service and who for the most part were here exposed to malaria infection for the first time. The observance of antimalaria precautions and the taking of a suppressive drug were enforced. Nearly all if not all infections were due to *P falciparum*. Subtertian malaria is hyperendemic and transmission may occur at any season. *A gambiae*, *A gambiae* var *melas* and *1 funestus* are the vectors.

Of 846 unselected cases 684 were of the febrile type. 83 of the gastro-intestinal type (gastric 11 diarrhoeic 60 dysenteric 12). 39 of the respiratory type. 10 of the myalgic type. 2 of the cerebral type. Twenty four cases were non febrile the patients suffering only from headache and slight malaise. four others had jaundice.

In the febrile type fever is the main feature. The sudden onset was attended by chilly feelings or shivering but rigors were observed on only 22 occasions. Rigors should suggest the possibility of the onset of blackwater fever and necessitate a close watch on the patient and his urine. Vomiting occurred in about a third of these patients in the febrile stage and in some cases it was very distressing.

In the gastric form vomiting was the principal feature and the fever was mild. some of the patients were sent to hospital with a diagnosis of dyspepsia or acute gastritis. In the diarrhoeic form simple diarrhoea with colicky pain was the predominant symptom. none of these patients had high fever and 11 of them had no fever at all while in hospital. No organisms of pathogenic significance were found in the stools. Diarrhoea with blood and mucus in the stools characterized the dysenteric form. culture of the stools never revealed the presence of pathogenic organisms. The symptoms as in all other forms readily yielded to specific malaria therapy.

Symptoms of an acute or subacute bronchitis characterized cases of the respiratory type. Some fever was the rule but in a few cases it was insignificant or absent.

Muscular pain and stiffness were the main features of the ten cases of the myalgic type. in six there was no fever.

Both cases of the cerebral type recovered. One of the patients was gravely ill with delirium a paralytic squint and a left extensor plantar response.

Four patients subsequently developed blackwater fever and two of them died.

Less than 10 per cent of the patients could be described as severely ill and less than 1 per cent as dangerously ill. Most of those severely ill were patients who responded unusually slowly to anti malaria

drugs. Only 2.4 per cent of the patients were invalided home. The authors consider that—given favourable conditions—malaria in West Africa at the present time need not enjoy the evil reputation that it has had. Wherever possible patients should be treated in hospital and be kept there for at least 12 to 14 days. The provision of convalescent camps might further reduce disability from malaria.

In the beginning patients were treated with a full course of quinine mepacrine and pamaquin. The assumption that this would lessen the relapse rate was not justified by events. Then patients in one ward were treated with quinine followed by pamaquin, those in another with mepacrine followed by pamaquin. The quinine patients responded more quickly to treatment but return cases were somewhat fewer in the mepacrine pamaquin ward. Subsequently the use of pamaquin was abandoned, the destruction of gametocytes in these patients was of little practical value where there was so large a reservoir of infection in the native population. Finally the routine treatment was by the administration of a quinine salt in solution by mouth, 10 grains three times a day for two days; this period was extended to three days if the patient's temperature had not fallen below 100 F. at the end of 48 hours. During the subsequent six days 0.1 gm. of mepacrine three times a day was given. When this course of treatment was completed the patient resumed his usual suppressive dose of quinine or mepacrine. Where vomiting prevents the absorption of quinine solution by mouth tablets of quinine dihydrochloride can often be retained. Quinine by injection was reserved for sufferers from pernicious forms of malaria and for very exceptional cases which did not appear to be responding to quinine by mouth. Both intramuscular and intravenous injections of quinine were used on occasion without ill effect.

In an editorial the *British Medical Journal* comments on the surprisingly mild nature of the malaria cases described so startlingly different from that reported in many of the older accounts of malaria in West Africa. The virtual absence of pernicious forms is very noticeable. Perhaps suppressive medication and other preventive measures were responsible for the mild type of infections encountered. The Command and the troops are more malaria conscious than they were in the last war when our forces suffered so much more severely in places in which malaria was no more severely endemic than it is in West Africa.

Norman White

DOV C S D & MEYER P F. An Unusual Case of Cerebral Malaria
Brit Med J 1944 Jan 29 149 1 chart

A soldier in West Africa was admitted to hospital late at night in a drowsy condition five days after falling sick. Examination of the blood revealed a very heavy *P. falciparum* infection, 35 per cent of the red cell contained parasites. Of the infected cells 17 per cent contained two ring forms each and 1 per cent three or four. He was given 10 grains of quinine dihydrochloride intravenously and 12 grains by mouth at 11.30 p.m. the latter dose being repeated in six hours. Next day he took 10 grains of quinine six hourly without vomiting. In spite of treatment cerebral symptoms became more pronounced, he was quite unconscious, cold and collapsed 36 hours after the commencement of energetic quinine treatment. Although he had taken fluid fairly well he had passed very little urine. A

glucose saline drip was put up and by this route 30 grains of quinine and two blood transfusions each of 500 cc were given during the course of 24 hours. No urine was passed that day. The following day the urine (voluntarily passed) was typical of that of blackwater fever. No more quinine was prescribed but alkaline treatment and two intramuscular injections (each of 0.1 gm) of mepacrine methane sulphonate were given followed by mepacrine (0.1 gm tds) by mouth. After all this specific treatment hyperpyrexia (106 F) developed. The patient made a recovery that was complicated by hypostatic pneumonia which was treated with sulphadiazine 1 gm four hourly.

Norman White

HUSSAIN K. K. & BROADBENT M. S. R. Some Intestinal Symptoms associated with Malaria. *East African Med J* 1943 Oct v 20 No 10 347-9

Clinical notes are given of four cases of *P. falciparum* malaria in which the symptoms suggested an acute abdominal or intestinal emergency. One patient was on the point of being operated upon for the relief of intestinal obstruction when the discovery of a heavy malaria infection led to the intramuscular administration of quinine which resulted in complete recovery. Acute abdominal pain, diarrhoea with blood stained stools and acute pain in the groin were respectively the predominant symptoms in the other three cases. The symptoms in all cases responded to anti malaria treatment.

Norman White

SIMPSON W. M., LEAKE W. H., McMAHON A., GUDEX T. V. & RUECKERT R. R. Experiences with Malaria at an Advance Base in the South Pacific. A Report of 4647 Admissions at ——. *U S Nav Med Bull* 1943 Nov v 41 No 6 1588-95

The experiences related were acquired in a South Pacific Island Base in which malaria was hyperendemic. During the first year of occupation of the Island there were 4647 hospital admissions for malaria (3417 individuals) among U.S. military and naval personnel. 880 of the patients acquired infection in other bases.

A statistical study is presented of 1184 cases in which plasmodia were found in blood smears in the laboratory of the Naval Base Hospital. Of these 88 per cent were ordinary cases in that they responded to one course of therapy. The remaining 12 per cent were refractory cases in which two or more courses of treatment were necessary before symptoms and blood parasites disappeared. Of the ordinary cases *P. vivax* was identified in 38.1 per cent, *P. falciparum* in 25.9 and *P. malariae* in 1 per cent. In 35.5 per cent it was not possible to identify the species; most of these were early cases in which trophozoites were scanty and immature. In general *P. vivax* infections resulted in milder attacks than did *P. falciparum* infections; of the former 24.6 per cent and of the latter 20 per cent were recurrences or reinfections. A palpable spleen was noted in only 15.9 per cent of ordinary cases and anaemia (less than 3,500,000 red cells per cmm) in 7.4 per cent of *P. vivax* and in 19.7 per cent of *P. falciparum* infections. Twelve of the ordinary cases showed definite signs of cerebral involvement. Jaundice occurred in only 1 per cent of cases. Only 38.8 per cent of these patients had received suppressive quinine or atabrin therapy for more than a month before the onset of the attack.

Of the 133 cases that were refractory to one or more courses of treatment 32.8 per cent were *P. vivax* 45.9 per cent *P. falciparum* and 2.4 per cent *P. malariae* infections. In 18.9 per cent the species was undetermined. Symptoms were most severe in *P. falciparum* infections which had a much greater tendency to produce anaemia. Persistent gametocytes were in almost all cases *P. falciparum*. Parenteral atabrin or quinine had to be administered in 75 per cent of the refractory cases. Only one patient developed blackwater fever; he recovered. Only one of the total 4,647 patients died; his malaria was complicated by hepatitis and jaundice following yellow fever vaccination.

Suppressive treatment during the early days of the occupation of the island base was by a daily dose of 10 grains of quinine. Later 3 grains of atabrin twice a week were given. Nearly half the cases of malaria reported were in patients who had received regular suppressive treatment. The treatment of the attack that has given the best results consists of 30 grains quinine hydrochloride and 4½ grains atabrin daily (in three divided doses) for 3 days; atabrin 4½ grains daily for the next four days. Quinine is given in solution. If there be much vomiting atabrin 3 grains is given intramuscularly twice a day for one or two days after which the treatment is continued by mouth. If gametocytes persist plasmoquine is administered. After two days rest from all specific therapy quinine hydrochloride 10 grains is given daily for five days on the first two days of which a third of a grain of plasmoquine is given twice a day and once a day on the remaining three days.

No significant toxic reactions following the use of atabrin were ever observed and liver function tests never revealed any damage to that organ resulting from the long-continued administration of atabrin.

Norman White

SIMPSON, W. M. & SAGEBIEL, J. L. Cerebral Malaria. A Report of 12 Cases encountered at U.S. Naval Base Hospital — U.S. Naval Medical Bulletin 1943 Nov. 1: 41 No. 6: 1596-602

The 12 cases of cerebral malaria described were treated in a Naval Base Hospital in a South Pacific Island; five of the cases were admitted to that hospital after the acute attack had more or less subsided. The description is prefaced with a note on the pathology of cerebral malaria. A sudden onset of epileptiform convulsions and coma occurred in nine cases; status epilepticus was common. Three patients developed coma without convulsions. The coma varied from semi-stupor with purposeless movements to profound shock with complete lack of response to all stimuli. Four patients had signs and symptoms of meningitis. Photophobia and headache were usually present. Acute confusional psychosis developed in six cases lasting from 2 to 12 days with lucid intervals. During early convalescence mental fatigability was a prominent symptom. All patients finally regained complete mental and emotional normality. The febrile reactions were highly irregular.

In eight cases in which the cerebrospinal fluid was examined it was found to be clear, colourless and under moderately increased pressure. A pleocytosis varying from 30 to 160 cells was found in cases with meningitic symptoms and signs. The removal of 25 to 30 cc. of spinal fluid was followed by prompt clinical improvement.

Treatment included the intravenous injection of 7½ grains of quinine dihydrochloride in 250 cc. normal saline repeated 8-hourly until the

patients could take quinine by mouth in doses of 30 grains daily for a week. The injections take not less than 30 minutes to administer. The response was dramatic in most cases. The oral administration of nembutal or sodium amytal may be useful. When the patient is violent sodium amytal should be given intravenously. Spinal puncture should be done at the outset and repeated daily until clinical improvement occurs. Absolute rest in bed is essential. In one case the intravenous injection of quinine was followed by a moderately severe shock reaction. 0.5 cc of 1:1000 epinephrine relieved the patient's alarming symptoms. All the patients made a complete recovery.

Norman White

BUTLER F A Malaria Control Program on a South Pacific Base
US Nav Med Bull 1943 Nov v 41 No 6 1603-12 1 fig & 1 chart

This describes the success achieved in controlling malaria at a base on a South Pacific island in which malaria was hyperendemic. It is a mountainous island with a flat poorly drained peripheral plain through which numerous small streams flow and which is covered by either jungle or coconut groves. The climate is uniformly warm there is a wet and dry season and the annual rainfall approximates 90 inches. The indigenous population has been declining for many years. No malaria control work had ever been attempted. Pest mosquitoes abound. The only malaria vector is *A. punctulatus* var. *moluccensis* which breeds freely in rain pools, road ruts and other surface waters and during the dry season in semi shaded marginal pools or streams that are partly covered by vegetation.

In April 1942 the malaria rate among troops on this base was 264.5 cases per 1000 per year for new admissions—267.5 for all admissions. In April 1943 the rate had fallen to 130 per 1000 per year—179 for all admissions. Man-days lost in April 1943 were only one fifteenth of the loss in April 1942. It is not possible to assess the contribution which any particular control measure has made to the striking success achieved. The measures described include camp site selection, oiling, drainage, screening, carrier control, suppressive treatment and the establishment of good malaria discipline. The development of extensive drainage and stream clearance projects is considered the most effectual measure. Good malaria discipline is absolutely essential; this has been found to depend on the willingness of officers to assume responsibility in this matter. Good malaria discipline has kept malaria to low levels in units occupying very malarious areas. Very little use has been made of insecticides and repellents. Mass atabrin therapy of native populations has reduced the numbers of native carriers. Suppressive therapy is an important temporary measure while control is being organized. No toxic effect of continued atabrin administration 0.4 gm weekly has ever been observed though mild initial intolerance (nausea, vomiting and diarrhoea) was occasionally observed.

Norman White

ECKSTEIN A Malaria in Childhood *Acta Med Orientalia (Palestine & Near East Med J)* 1943 Aug-Sept v 2 No 4 123-32

Infantile malaria differs in many respects from the malaria of adults. The author of this comprehensive paper considers that the peculiar features of malaria in childhood have received insufficient attention and sets out to make good the deficiency. In a previous paper he has

described some of the anomalous manifestations of malaria in young subjects more especially with regard to disorders of nutrition and metabolism [this *Bulletin* 1943 v 40 516]. In the present paper the subject is dealt with more comprehensively.

The author's experience has been gained in Turkey in that country positive malaria findings are common in the blood of children of the youngest age groups who present few or no symptoms of that disease and such symptoms as there are are often indicative of some quite other pathological condition. The majority of such patients have received no anti malarial treatment. It is interesting that there is a special Turkish name for occult malaria *gizli sıtma*.

Congenital malaria is not quite so rare as is generally believed. Five definite cases were seen in hospital practice though that hospital was in a region of only moderate malaria endemicity. In many of the youngest malaria patients there may be little or no fever in spite of abundant parasitaemia.

Malarial attacks in children may occasionally though very rarely cause the activation or generalization of tuberculosis with subsequent tuberculous meningitis. There is a very close relationship between malaria and noma. Noma is a common disease in Turkey. The author has seen 100 cases in seven years. In 91 per cent of these cases malaria infection was diagnosed. Measles had preceded noma in 1 per cent and typhoid fever in 2 per cent. This was in Ankara where malaria is not endemic (of 123 000 children out patients malaria was diagnosed in only 3.4 per cent). The majority of the noma patients were by no means cachectic. Young children were the chief sufferers. The seasonal incidence of noma reaches its height in August as does the seasonal incidence of malaria.

Detailed consideration is given to the difficulties of malaria prophylaxis in children. There is need for very close cooperation between paediatrists and malarialogists. Malaria experts might benefit from a special paediatric training. malaria centres might then be child welfare centres as well.

A summary does less than justice to the large amount of information concerning anomalous forms of malaria in childhood.

Norman White

BROWNE, S. K. Malarial Urticaria—Two Case Reports. *Indian Med Gaz.* 1943 Jan v 78 No 1 48.

Two cases of malarial urticaria successfully treated with quinine and alkaline mixture are reported. Both of them showed hypersensitivity to malaria parasites in a hyperendemic area. In case 2 the rash did not disappear while the peripheral blood showed malaria parasites and the temperature continued. It is likely that with the sporulation of malaria parasites in the circulation a definite but unknown product is liberated which causes allergy resulting in urticaria.

THOMAS-NEUMAN, E. Die Splenomegalie im Bilde der chronischen Malaria. [Splenomegaly in Chronic Malaria.] *Deut Tropenmed Ztschr.* 1943 Jan 1 & 15 v 47 Nos 1 & 2 1-37 33-50 [Numerous refs.]

In a long article of 50 pages accompanied by an extensive bibliography the author discusses the changes occurring in the spleen liver bone marrow and blood in chronic malaria.

The paper contains a great store of information in such a form that it will be of great value to all students of malaria but naturally it does not lend itself to the preparation of an abstract. In the section on treatment the author shows that striking benefit resulted in 17 cases of malarial cachexia treated by quinine 0.1 gm thrice daily 0.06 gm ephedrine thrice daily together with arsenic and iron. Accompanying diseases such as syphilis helminthiasis amoebiasis and malnutrition also received suitable treatment.

The cases do not seem to have included any of the severest types of malarial cachexia these could not have been expected to respond so promptly. The average duration of the treatment was 30 days the average increase in the red blood cells was from 1 800 000 to 3 400 000 and in the haemoglobin from 43 to 70 per cent. The average diminution in the size of the spleen was from 4 or 5 (Schuffner's index) to 2 or 3.

The most striking success was in a case in which the red cells rose from 1 080 000 to 3 070 000 the haemoglobin from 45 to 70 per cent and the spleen was reduced from 5 to 2 after only 14 days of treatment which included chenopodium for hookworm infection and neosalvarsan for syphilis.

The extent to which other diseases entered into the picture is shown by the fact that among the 17 patients 10 were treated for hookworm disease 7 for tertiary syphilis and 4 for amoebiasis. 11 are shown as suffering from malnutrition. Splenectomy is condemned as being irrational and dangerous the spleen is considered to play an important part in the establishment of immunity. Ephedrine is preferred to adrenalin as advocated by ASCOLI the former drug has a more prolonged as well as a safer action in causing a reduction in the size of the spleen.

The author's experience has been chiefly of male adults in Central and South America and in Haiti. He rightly emphasizes the importance of economic factors and of measures of control of preventable diseases in general but he is on debatable ground when he refers to the adverse influence of the capitalistic mentality on the physical well being of indigenous populations.

John W D Megaw

PLACERES M El valor funcional del hígado en el curso del paludismo crónico (Contribución al estudio de la exploración clínica funcional del hígado de las hepatitis y hepatosis palúdicas) [Function of the Liver in Chronic Malaria] *Mem d l Congr Méd Centro americano San Salvador 5-12 Nov 1938* 593-631 32 figs [Bibliography]

CARES R Rapid Diagnosis of Malaria by the Use of a Wratten Light Filter *J Lab & Clin Med* 1943 Nov v 28 No 14 1750-51

The E light red filter (series 23A) of the Wratten light filters (Eastman Kodak Co) has a spectral transmission range parallel to that of eosin and transmits more light in the red part of the spectrum than eosin does the red cells consequently appear lighter. The blue-stained protoplasm appears darker owing to absorption of blue and green. For these reasons the use of this filter is recommended to facilitate recognition of malarial parasites in a stained blood film. The simplest and cheapest form of the E filter is the dye-stained gelatin film supplied

in one-inch and two-inch squares these can be cut up and mounted between cardboard and fitted either over the substage condenser or in the ocular

J F Corson

DAWBER T R On the Importance of Malaria as a Cause of False Positive Serologic Reactions *Ann Intern Med* 1943 Oct v 19 No 4 651-5 [Summary appears also in *Bulletin of Hygiene*]

The author of this paper stresses the importance to the individual of a false diagnosis of syphilis saying that although false positive serologic reactions may be so infrequent as not to be of any great moment from the point of view of the public health each false diagnosis of syphilis may have serious and even disastrous implications for the person concerned it follows that every practitioner should be fully aware of the pitfalls After mentioning as causes of false reactions yaws leprosy infectious mononucleosis malaria pneumonia vaccinia measles and other acute febrile diseases he regards infectious mononucleosis and malaria as probably being most important in the U S A on account of their frequency and the fact that both are often present in a sub-clinical state

This he says is particularly true of chronic or latent malaria and he thinks there can be little doubt that when samples are taken from all persons in such a place as a factory or a camp certain of the donors of the specimens may have latent malaria Whether such persons in whose blood parasites cannot at the moment be demonstrated can give false positive syphilitic serum reactions is still doubted and the author quotes MOHR *et al* (*Arch Intern Med* 1941 v 68 898) as having said that a positive reaction may be expected only during or shortly after the acute febrile illness The present author's thesis is that latent malaria may have the same effect and he cites two cases in which failure to demonstrate malarial parasites in the blood led to positive serum reactions being falsely attributed to syphilitic infection

At the U S Marine Hospital in four years 64 cases of malaria were dealt with and of this number 19 gave positive reactions for syphilis of this number 11 certainly or probably had syphilis Of the eight in which the author considers the reactions to have been false he details the histories of three The first patient had had a penile sore five months before admission to hospital and it had disappeared in two weeks Five days before admission he had had some fever and a routine blood test had given a positive reaction for syphilis these results were confirmed on repeated retests Three days after admission to hospital he had a typical bout of malaria and tertian parasites [presumably *P. vivax*] were found in his blood Treatment with quinine was started and the record shows that his blood tested 10 14 and 21 days later gave negative Wassermann and Kahn reactions having been strongly positive three days after the fever

The second patient had a history of rigors and repeated attacks of epistaxis a few days before admission to hospital Two and five days after admission specimens of blood gave positive reactions for syphilis As slides were negative for malaria a diagnosis of latent syphilis was made but eight days after the second of these tests the patient had a frank attack of malaria with tertian parasites in the blood and treatment with quinine was started three days later the syphilitic serum reactions were mostly negative or doubtful and a week later they were all negative

The author discusses the length of time during which the syphilitic serum reactions may persist and quotes KITCHEN *et al* [*Bulletin of Hygiene* 1939 v 14 619] as having found in inoculation malaria that it ranged from 8 to 66 days but in these cases the patients had repeated paroxysms. In his own series all but one became negative within ten days of the institution of anti malarial treatment. In the exceptional case details of which are given the reactions remained positive for 18 days after the last rigor.

The author thinks that it would be safe to reckon on the false positive serum reaction due to malaria disappearing within a month of the start of antimalarial treatment if this is by the long course method lasting six to eight weeks with the four-day method the reversal of the reactions may not be so rapid. L. H. Harrison

KEOGH Patricia & SHAW F. H. The Pharmacology and Toxicity of Alstonia Alkaloids. *Australian J Exper Biol & Med Sci* 1943 Sept v 21 Pt 3 183-6 7 figs.

The bark of *Alstonia* which is widely distributed in N Australia contains a mixture of rather ill defined and unstable alkaloids. Since they were said to resemble quinine they were investigated pharmacologically. Although they have been found in animal experiments to have little antimalarial activity their action on isolated organs bears a striking resemblance to that of quinine. Thus in the rat's intestine the alkaloids caused a fall in tonus and a temporary cessation of movement and then rhythmical movements. The non pregnant uterus of the cat is stimulated to contract. In the isolated frog's heart the amplitude of the beat is diminished but the rate is unaltered. In the intact cat a fall of blood pressure is produced. In striated muscle stimulated to contract the alkaloids produce a fall in the tension developed followed by a rise. The 50 per cent lethal dose for mice when given by intraperitoneal injection is 800 mgm per kgm for rats 500 mgm and for guineapigs 500 mgm per kgm. Figures for various other animals are also given. There is a fairly close parallelism with the lethal doses for quinine. [For further details the original should be consulted] F. Hawking

ALBERTO ALVARADO C. Dirección general de paludismo. Memoria del año 1942. [Malaria Service Report for 1942]. *Bol Sanitario* Buenos Aires 1943 Jan-Mar v 7 Nos 1-3 3-29 1 chart.

DAVEY D. G. Biology of the Malarial Parasite in the Vertebrate Host [Correspondence]. *Nature* 1944 Jan 22 110-11.

The author discusses the early development of malarial parasites in birds and from observations on *P. gallinaceum* concludes that after injection of sporozoites into the peripheral blood these disappear from the blood stream within a few minutes and enter the tissues where they pass through a developmental phase. Following this primary phase there is a release of parasites into the blood stream and in the case of *P. gallinaceum* into other tissue cells where the secondary tissue phase represented by the well known exoerythrocytic schizonts is formed. These secondary phase forms unlike those of the primary phase are capable of indefinite schizogony and may persist as long as infection lasts. The secondary tissue phase may develop from the erythrocytic forms or from the primary tissue phase. These two phases

react differently to certain drugs. The author thinks that the primary tissue phase may be common to all malarial parasites whereas the secondary phase has been described definitely only in the case of *P. gallinaceum* and *P. elongatum* and probably in *P. circumflexum* and *P. cathemerium*. It is surmised that the secondary tissue phase may be a specialized feature of a few malarial parasites only. It is an urgent problem to discover if this phase is a feature of the human parasites. It is stated that the name cryptozoites has been introduced for the parasites of the primary tissue phase but the term was limited by its introducers to all the stages of development from the sporozoite up to the first mature schizont and not to the second or any later generation of parasite. The writer of the letter does not state whether his primary tissue phase represents only one or more than one generation of parasites [this *Bulletin* 1943 v 40 815].

According to the views expressed by the author from the chemotherapeutic point of view there are five different forms of parasite which have to be considered: 1) sporozoites primary phase forms secondary phase forms erythrocytic form gametocytes. A true causal prophylactic it is stated will be one which acts upon the sporozoite or the forms of the primary phase. C M Henson

ADLER S & TCHERNOMORITZ I. The Extra Erythrocytic Origin of Gametocytes of *Plasmodium gallinaceum* Brumpt 1935 *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 148-51 1 fig

The authors have shown in a previous paper [this *Bulletin* 1942 v 39 574] that the administration of quinine by injection in daily doses of 150 mgm per kgm of body weight will prevent the development of pigmented erythrocytic forms though exoerythrocytic schizonts continue to develop in the internal organs. From time to time however small unpigmented parasites appear in the erythrocytes evidently as a result of invasion by merozoites of the exoerythrocytic cycle. Continued administration of quinine will bring about the eradication of these young erythrocytic forms which are thus given no opportunity to develop further. If however with the appearance of these young erythrocytic forms which may occur in as many as 10 per cent of the erythrocytes quinine administration is stopped the young forms will develop not only into pigmented schizonts but also into gametocytes. The first recognizable gametocytes may be found in 27½ hours and mature forms in about 40 hours. It is thus clear that gametocytes may develop directly from the merozoites which result from exoerythrocytic schizonts. C M Henson

SCHENK T D. Zur Wirkung von Arzneistoffen auf die exoerythrocytären Entwicklungsformen der Plasmodien [The Action of Drugs on the Exoerythrocytic Forms of Malaria Parasites] *Arch f Exper Path u Pharm* 1943 June 17 v 201 No 5 502-19 [47 refs]

The action of quinine plasmoquine and atebria on erythrocytic and exo-erythrocytic forms of *P. cathemerium* has been investigated *in vitro*. The latter are very numerous in the livers of canaries infected by sporozoites but are scanty in the peripheral blood. The effect of drugs

action was judged by stained preparations and by the nature of the infection which resulted in fresh canaries inoculated intramuscularly with the various preparations

The technique employed was as follows A canary previously infected with sporozoites or by liver emulsion rich in exo erythrocytic forms was killed at the height of blood infection by severing the neck vessels The total blood was collected in citrate and further diluted with saline Three series one for each drug was prepared in small glass vessels as follows —

- (1) a 1 cc saline+0.3 cc infected blood Control
b 1 cc drug+0.3 cc infected blood
- (2) 1 cc drug+0.3 cc infected blood+a small amount of normal canary liver emulsion
- (3) a 1 cc saline+canary liver emulsion rich in exo erythrocytic forms Control
b 1 cc drug+canary liver emulsion rich in exo erythrocytic forms

The drugs were used in the following concentrations which are very much higher than is attained *in vivo* namely quinine 1/300-1/800 plasmoquine 1/2000-1/3000 atebirin 1/200-1/300 They were allowed to act for a period of five hours at a temperature of 4°C After treatment the blood which contained erythrocytic forms proved mostly non infective to fresh canaries while on the other hand the liver preparations rich in exo erythrocytic forms nearly all gave rise to acute infections From these experiments it appeared that the latter forms are resistant to the drugs employed The addition of fresh liver emulsion to infected blood inhibited or depressed the action of the drug in only a few cases The action of atebirin was least impaired by fresh liver while that of plasmoquine was most affected by its presence as a result it is thought of being bound by the tissue The fact that exo-erythrocytic forms of *P. cathemerium* are not sensitive to the drugs tested is ascribed to their particular habitat and metabolic characters

J D Fullon

BLACKWATER FEVER

COLE A C E A Case of Anuria in Blackwater Fever *East African Med J* 1943 Nov v 20 No 11 381-2

This is a report of a remarkable case of blackwater fever with unusually mild symptoms but with almost complete suppression of urine for eight days

So far as was known the patient a young Indian male had had only one other attack of malaria and that occurred a year previously In the present attack he had had fever for four days before admission to hospital and had taken five grains of quinine daily for it on the day of admission he noticed that his urine was dark

During the first four days in hospital he had slight jaundice and occasional vomiting his urine was dark red contained much albumin and gave a dark brown amorphous deposit with some casts No

malarial parasites were found in his blood. Fluids were given in the form of lemonade, tea and alkalis by mouth and glucose saline (1 600 cc) on the 3rd day and 1 m (800 cc) on the 4th day. On the 4th day he seemed quite well with normal temperature, blood pressure 120/60 but he had occasional small vomits, his blood urea was 260 mgm per 100 cc and his face was slightly puffy. On the 8th day beer was prescribed, one bottle daily and next day he passed 18 oz of clear urine containing only a trace of albumin. On the 16th day his temperature rose to 100 F and his blood showed numerous subtertian malarial parasites. Atabrin was given and his temperature fell in two days and convalescence was uneventful. Four weeks after the onset of the illness tests of his urine showed no albumin and gave renal function (van Slyke) figures of 93 and 114 per cent of normal. The important features of the course of the illness are shown in a table reproduced here. —

Day	Urin	Fluid intake	Blood urea	Temperature	Haemoglobin
	drachms		mgm		per cent
1	7		—	99.4	—
	6	1	104	100.4	78
3	11	109	—	100.0	—
4	3	5	6	99.0	—
5	6	37	—	98.0	—
6	4	59	—	normal	—
7	6	58	—	—	—
8	7	41	—	—	60
	0				
9	4½	4	386	—	—
10	18	46	—	—	—
11	53	43	14	—	—
12	116	43	—	—	—
13	109	54	—	—	—
14	110	50	117	—	60
8	—	—	3	—	68

The author remarks that the illness resembled the effects of obstruction of the ureters rather than acute nephritis. Fever was low and haemolysis slight.

J. F. Corson

TRYPANOSOMIASIS

LAVIER G. L'évolution de la morphologie dans le genre *Trypanosoma* [Evolution of Morphology in the Genus *Trypanosoma*] *Ann. Parasit. Humaine et Comparée* 1942-1943 v. 19 Nos 4-5-6 168-200 8 fig. & 1 plate [33 refs.]

The author first gives a critical review of the various methods of classification proposed for trypanosomes and considers their life-histories and especially their cycle in the vector. He concludes that the classification should be based entirely on morphological characters and that the blood form of the trypanosome as it occurs in the vertebrate host should be the basis for the differential diagnosis of species. However, since the appearance of different trypanosomes varies in the course of the infection it is necessary to define more precisely the stage

of the trypanosome to be used for this purpose. With this object in view the author considers the characteristics of the trypanosomes parasitic in various groups of vertebrate hosts.

The most ancient forms are long and slender trypanosomes with a well developed undulating membrane, a kinetoplast situated at some distance from the posterior end of the body and from the nucleus. Such forms are found mainly in fishes. In some of the amphibians and reptiles a new type of trypanosome makes its appearance: its body is broader while the kinetoplast and nucleus tend to approach each other. A further modification takes place in some trypanosomes of the Anura and lizards: the broadening of the body attains its maximum expression in the large rounded forms of the *rotatorium* type. The trypanosomes of birds are somewhat similar to the thick set forms seen in reptiles but the kinetoplast tends to be further separated from the nucleus than in the latter. Finally in mammals there appears a special form represented by trypanosomes of the *lewisii* group.

The author believes that the phylogenetic development of the trypanosomes is correlated with the evolution of their vertebrate hosts. Originally of a uniform type (e.g. in fishes) the trypanosomes gradually become more diversified (e.g. in amphibians and reptiles) but later their development undergoes regression and they again assume a more uniform appearance (e.g. in birds and mammals). In the foregoing groups of trypanosomes multiplication takes place only in certain stages of their life cycle giving rise to a form which is incapable of dividing and which according to the author constitutes the adult form. The curtailment of the development noted in avian and mammalian trypanosomes takes place at the expense of the adult form by a process similar to neoteny.

The last group to be considered is that of the pathogenic mammalian trypanosomes. Their main characteristics apart from pathogenic action are (1) continuous multiplication [as first emphasized by the reviewer (1936) *Parasitology* v 28 98] (2) loss of rigid host specificity and (3) development in the anterior station of the vector. Since the first two features have also been observed in certain strains of non-pathogenic trypanosomes which had become virulent (e.g. *T. lewisi*) they are regarded as characteristic of pathogenic trypanosomes while the uninterrupted multiplication of the latter is interpreted in the sense that they had undergone the regression noted above with the result that the true adult forms have disappeared leaving only the young forms which are capable of dividing indefinitely.

Morphologically the pathogenic trypanosomes are characterized by three main types: (1) monomorphic long trypanosomes with a free flagellum (*T. vivax* and *T. uniforme*) (2) monomorphic short trypanosomes without a free flagellum (*T. congolense* and *T. simiae*) (3) polymorphic or dimorphic trypanosomes comprising both of the above types (*T. brucei*, *T. gambiense*, *T. rhodesiense* as well as *T. evansi* and *T. equiperdum*). The different species are then dealt with separately. It is thought that all the pathogenic forms have originated from trypanosomes of ungulates which originally developed in the posterior station of their vectors but later began to be transmitted by tsetse flies and adapted themselves to development in a salivary medium (anterior station). [Somewhat similar views were expressed by the reviewer to explain the origin of the development in the anterior station. HOARE (1925) *Arch. Russes Protistol.* v 3 177. HOARE & COUTELEN (1933) *Ann. Parasitol.* v 11 196.]

In discussing the affinities of *T. evansi*: Lavier upholds his earlier view (1927) [also suggested by the reviewer in 1925 (*loc cit*)] that this species is the ancestral form from which *T. brucei* had originated, as against the reviewer's recent conclusion [HOARE (1940) *Parasitology* v 30 105] that *T. evansi* is an aberrant race of *T. brucei*.

Lavier further emphasizes the fact that the degree of adaptation to the development in the anterior station of tsetse manifested by the pathogenic trypanosomes is considerably lower than the adaptation of the non pathogenic mammalian trypanosomes to development in the posterior station of their intermediate hosts. While in the latter group almost 100 per cent of the vectors become infected the infectivity for tsetse flies is 50 per cent in *T. max* less in *T. conolense* and quite insignificant in the *brucei* group [below 1 per cent according to the latest data of BURR this *Bulletin* 1943 v 40 369]. The relative transmissibility by their vectors also reflects the evolutionary history of the different trypanosomes the more perfect the adaptation between parasite and vector the older the association between the two.

The paper is well illustrated by a number of figures including a diagram showing the morphological affinities of trypanosomes from different classes of vertebrate hosts.

C A Hoare

LOURIE E M & COLLIER H O J Unimpaired Susceptibility of *Trypanosoma rhodesiense* to Arsenicals after Intensive Treatment by Mepacrine *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 205-10

Repeated exposure of trypanosomes to subeffective doses of acridine compounds such as acriflavine lead to the development of trypanosomes which are resistant to acriflavine and to arsenical compounds. Mepacrine (atebrin) consists of an acridine nucleus and a long side-chain. Men taking mepacrine in Africa to prevent malaria may sometimes become infected with trypanosomes and the question was asked whether the mepacrine would cause the trypanosomes to become resistant to arsenicals (tryparsamide). The possibility was tested by exposing trypanosomes (*T. rhodesiense*) to the maximum tolerated amounts of atebrin alternately in mice and *in vitro* over a period of 20 weeks. No resistance to arsenicals or to mepacrine developed as the result of this treatment. It is concluded that the suppressive administration of mepacrine can safely be given to men exposed to trypanosomal infection without any risk of the development of arsenical or acridine-resistance in the trypanosomes.

F Harking

POTTER W B Acute Visual Impairment during Tryparsamide Therapy *Southern Med J* 1943 Oct v 36 No 10 697-101 [18 refs] [Summary appears also in *Bulletin of Hyg* 1943 12 12]

Visual defects with objective changes attributable to tryparsamide therapy have been reported by SLOAN and WOODS (1936) in 3.53 per cent of cases and by WOODS and MOORE [this *Bulletin* 1921 v 21 981] in 5.5 per cent. The defects have been classified as acute and chronic and of the latter there are cases with subjective symptoms only (shimmering and blurring of vision—without changes in the field of vision) and those with objective symptoms which consist chiefly in

contraction of the field of vision but only rarely in interference with central vision

The author of the present paper after mentioning the above findings by other workers says that comparatively little attention has been paid to acute manifestations of trypanosamide poisoning of which he relates four cases they represent less than 1 per cent of 500 patients he has treated with this remedy. The first a tabetic negro woman had foggy vision 24 hours after a first injection of trypanosamide (3 gm) and on the 5th day with normal central vision and no visible changes in the fundi the field was contracted to within 5 degrees of the fixation point. A month later when the patient was last seen the field had expanded to 15 to 20 degrees a year later reports suggested that there had been no further improvement. The second a white tabetic man developed much the same symptoms within 24 hours of the second of two injections of 3 gm trypanosamide at a week's interval. The patient was observed for a period of a year and a half and the fields had expanded over a period of 6 months to within five degrees of their previously normal limits. The third a tabetic white woman had severe loss of vision with loss of light perception found five days after an injection of 3 gm trypanosamide. Three weeks later central vision had returned but there was marked contraction of the field in all meridians. At the end of five weeks the day after institution of fever therapy the author's report is that. Clinical finding available indicated vision of Jaeger IV there was no distance visual record available. The confrontation field was approximately normal. Fundus findings continued to be negative. In the fourth case a white female tabo-parctic with normal vision blindness was so severe 48 hours after the injection of 3 gm trypanosamide that the patient required continual assistance in eating and getting about. Seven weeks later central vision had returned but was defective (20/200 in each eye) and there was marked contraction of the fields.

In discussing this type of accident the author favours the view that it is due to idiosyncrasy and he quotes a case of LEINFELDER'S (*J Amer Med Ass* 1938 v 111 1276) in which death from other causes nine days after similar loss of vision gave the opportunity for histological examination with these results. In the necropsy specimen of the optic nerve a moderate degree of retinal sclerosis was noted. In the central retina areas of degenerative changes were noted in the inner nuclear layer and cellular and nuclear structure could not be visualized. In the peripheral retina where the greatest degenerative change was noted to occur ganglion cells showed a cloudy cytoplasmic appearance and Nissl substance had largely disappeared. These changes were compared by Leinfelder to the cellular reaction in acute intoxication of the central nervous system.

Potter is inclined to think that injections of thiamin have little therapeutic value in such cases and the same applies to spinal drainage. On the question of the value of preliminary examination of the fundi as a safeguard against such accidents he says that although in these cases no contra-indication was found it has been established that thorough preliminary examination can guard against progressive deterioration of vision consequent on the chronic type of trypanosamide reaction and the Supreme Court of Virginia ruled that failure to examine the eyes before the use of trypanosamide or upon the appearance of visual effects constituted negligence.

L. H. Harrison

SANDGROUND J H & HAMILTON C R Studies on the Detoxication of Organic Arsenical Compounds I Detoxication by means of p-Aminobenzoic Acid of certain Pentavalent Arsenical Drugs given in Massive Doses to Rats II Correlation of the Quantity of p-Aminobenzoic Acid required to protect Rats against High Doses of Carbarsone and Arsanillic Acid J Pharm & Exper Therap 1943 v 78 102-14 203-8

Studies on the Detoxication of Organic Arsenical Compounds III The Time-Factor Influencing p-Aminobenzoate Protection of Rats receiving Lethal Doses of Phenyl Arsones Ibid 209-14 (Summaries taken from J et Bull 1944 Jan v 14 No 1 39 Signed R ALLCROFT

I As it has been demonstrated that p-aminobenzoic acid (PAB) inhibits the action of sulphonamides that are active against the malarial parasites the question whether a similar mechanism explains the susceptibility of pathogenic trypanosomes to certain pentavalent arsenicals was investigated because of the structural relationship between the arsenic compounds and sulphanilamide. Three groups of rats infected with *Trypanosoma evansi* were given daily one of the following treatments: (1) intravenous injection of 1000 m per kg of PAB (2) intravenous injection of 1000 m per kg of PAB plus a small subcurative dose of carbarsone (p-carbamylphenyl arsonic acid) and (3) daily dose of PAB plus a high dose (500 m per kg) of carbarsone. The results showed that PAB per se has no trypanocidal action of carbarsone doses of PAB interfere with the trypanocidal action of carbarsone. It was however observed that in contrast to previous experience none of the rats receiving the high dose of carbarsone and other pentavalent arsenicals died. While most of them survived the full 30-day observation period. Further experiments were carried out with rats to estimate the detoxicating action of PAB with carbarsone and other pentavalent arsenical compounds. As much as 1-3 g of PAB per kg body weight daily were given for 3-5 days with massive doses (about LD₅₀) of the arsenicals. In each case PAB was found to be very effective in reducing the fatalities among rats to which high acutely poisonous doses of the arsenical were given. The protective action of the PAB could be detected in the majority of rats within 24 hours of administration. Detoxication was independent of the route by which either the arsenical compound or the PAB was given. Also no inhibition between the trypanocidal action of the various arsenicals and the relationship between the protective action of PAB and the toxicity of PAB was given. In an investigation of the quantitative relationship of the sodium salt of the arsonate Carbarsone and arsanillic acid were used as typical phenyl arsonates. Taking 1200-1500 mg per kg as the minimum unarsal lethal dose of carbarsone (LD₅₀) it was found that all rats were protected against this dose by the same quantity on two subsequent days. Whether a smaller quantity of PAB would have an equally beneficial was not determined. To determine the lower extent of the protective range of PAB single diminishing doses were administered to several groups of rats which received injections of carbarsone.

or arsanilic acid at a rate approximating the LD_{50} respectively of these two compounds (1 000 mg per kg of carbarsone or 400 mg per kg of arsanilic acid) 500 mg per kg PAB was sufficient to confer protection on nearly all rats that received the LD_{50} of carbarsone while virtually total protection was afforded by 250 mg per kg PAB against the LD_{50} of arsanilic acid Below these levels partial protection for the group as well as for individual rats was observed It was found that a single injection of PAB was capable of conferring the protection

III Further experiments showed that the length of time of the administration of PAB before or after administration of the pentavalent arsenical compound significantly influenced the survival rate of the group Neutralization of the lethal effects of the arsenical was fully achieved when both PAB and arsenical were administered simultaneously (mixed) or when PAB was administered within one hour (in the case of carbarsone) or up to three hours (in the case of arsanilic acid) before the arsenical When however the arsenical was injected before the PAB as short an interval as 15 min for carbarsone and 30 min for arsanilic acid was associated with a significant reduction in the detoxicating action of PAB a greater lapse of time was associated with an almost directly proportional loss of protection In a discussion speculating on the mechanism underlying this detoxicating action of PAB it is stated that PAB does not confer much protection against lethal doses of the trivalent arsenicals with the possible exception of neoarsphenamine

CARMICHAEL J & BELL F R A Preliminary Study of 4,4-Diamidino Dimethyl Stilbene in the Treatment of *Trypanosoma congolense* in Cattle *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 145-6

This compound was shown by FULTON and YORKE [this *Bulletin* 1943 v 40 19] to be curative for *T. congolense* infections in mice In the present work the compound was given to cattle as a single dose of 5 per cent solution freshly prepared When injected intravenously doses of 2.5 and 5 mgm per kgm cleared the blood for 10-12 days but all six cattle relapsed When 10 mgm per kgm were given to six cows four were cured one relapsed and one was poisoned When 12.5 mgm per kgm were given to four cows two were cured and two were poisoned Two cows were given 10 mgm per kgm intramuscularly and both relapsed Two were given 12.5 mgm per kgm and both were cured

All the deaths but one occurred within a few minutes of the injection with extreme dyspnoea and profuse salivation In one case death was delayed for 1½ hours No delayed poisoning occurred

F Hawkin

FULTON J D & YORKE Warrington Studies in Chemotherapy XXXVI The Therapeutic Action of various Compounds in Mice infected with *Trypanosoma congolense* *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 152-7 [31 refs]

A useful detailed review is given of the action of drugs upon infections due to *T. congolense* for which the original paper must be consulted

Experiments were made on mice infected with this parasite a single dose of the compound being injected intraperitoneally. Many compounds were tested but some representative results are as follows the doses being given as m/m per 20 gm mouse —

	Minimum Effective dose	Minimum curative dose	Maximum tolerated dose
am 0.9 (p-am 0.9) 10 m — phen-	0.025	0	0.5
am 0.9 m h.v.	0	1	1
Diamidino-stilbene	0.1	0.5	1
Diamidino-dimethyl-stilbene	0	> 1	1
Tartar emetic	4	> 1	4
Surfen C	10	20	20
Formalin	10	10	10
Neostam	10	10	10

M. m. m. effective dose (M.E.D.)—The minimum dose which sufficed to clear the blood of at least 80 per cent of the treated mice irrespective of time. Relapse followed. *M. m. m. curative dose (M.C.D.)*—The minimum dose which sufficed to cure (thirty day observation) at least 80 per cent of the treated mice. See *W. J. Bull.* 1931 v. 23 909.

The two most active compounds were the phenanthridinium compound and diamidino-dimethyl-stilbene. Many other compounds were found to be inactive including suramin (Bayer 203).

F. Hawking

CHAGAS Filho Carlos. Molestia de Chagas no Brasil. Chagas's Disease in Brazil. *Bol. Oficina Sanitaria Pa. americana* 1943 Sept v. 22 No. 9 773-9. English summary.

An excellent though condensed account of Chagas's disease presented at the Pan American Conference held at Rio de Janeiro in September 1942. The address was delivered by the son of the Chagas who first described the disease in 1909 in Minas Geraes and who thought it was a local condition. It has since been shown to exist widely in America north and south. The author deals with the aetiology, pathogen, epidemiology, insect vectors, naturally infected reservoir hosts and measures of prophylaxis. He gives the following list of insects found naturally infected in Brazil: *Triatoma brasiliensis*, *Triatoma infestans*, *Eutima sordida*, *Panstrongylus megalus* [R. de Meillon's *pro. xus* he does not give in his list], *Triatoma melanocephala*, *Triatoma chagasi*, *Triatoma rubrofasciata*, *Triatoma itzei*, *R. pictipes*, *R. trumphi*, *E. maculata*, *E. ruficornis*, *P. gerstaeckeri* and *Carernicola pilosa*. The most important are the first five because they infest the houses. As reservoir hosts he mentions *Felis domesticus*, *Canis familiaris*, *Dasyurus novemcinctus*, *Euphratus sexvittatus*, *Dasyurus hybridus* (armadillos), *Chrysomys sururus* (squirrel monkey), *Tayra barba* (a weasel like animal), *Marmosa murina*, *Didelphis* sp. (opossums), *Tamaritupa tetradactylus* (ant-eater) and *Sus dom. s. s.* besides several species of bats.

Surveys are in progress in Rio Grande do Sul, Minas Geraes and in North Brazil to gather more complete data regarding insect vectors, reservoir hosts and the incidence of the disease in man.

H. H. Old Scott

MAZZA S & ORIBE H R Investigaciones sobre enfermedad de Chagas I La enfermedad de Chagas en el territorio nacional Formosa [Chagas's Disease I In the Formosa Territory, Argentina] Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy) Publicación No 66 1943 3-47 29 figs & 4 pls

In Formosa including Las Lomitas the authors have examined 2 116 Triatomidae and found 1 026 (48.5 per cent) positive. Of the total 434 were positive among 899 (48 per cent) in 86 dwellings in 33 localities in Formosa itself 265 positive among 477 (55 per cent) in 47 dwellings in 16 localities in the military zone and 327 among 740 in 87 dwellings in Las Lomitas (44 per cent). In the same areas 3, 2 and 4 acute cases respectively were seen in man and in the first district three armadillos in the second three kittens and a puppy and in the third five puppies were found naturally infected. In an adjacent district of Paraguay 17 adult insects 9 nymphs and 4 larvae were examined from three forts and 6, 6 and 3 respectively were positive altogether 15 (or as the authors call it 50 per cent). *Triatoma infestans* collected in the boles of trees near the dwellings have been found positive in 50-80 per cent. One ranch is quoted as an example here an acute case of Chagas's disease was observed and seven adult insects captured in the dwelling were all positive and one of two larvae also two kittens and a puppy had *T. cruzi* in their blood in large numbers though they seemed to be in perfect health totally unaffected by the infection. Finding infected insects in the stables and places not inhabited by human beings the authors were led to test whether horses as well as dogs and cats might serve as hosts and they easily infected a colt by inoculation conjunctivally by mouth and subcutaneously with the faeces of infected Triatomidae. They do not report natural infection in these animals. Human infection in Formosa was proved by Professor Mazza in May 1936 [this *Bulletin* 1937 v 34 135] and by January 1938 eleven cases had been reported. The authors give clinical details of nine of these.

Besides investigating the presence of *T. cruzi* in man and in wild and domestic animals the authors carried out the Guerreiro Machado test on 45 adults with cardiac signs who had lived for some years in Las Lomitas and found 15 of them to react positively. The physical signs of these are detailed with reproductions of the teleradiographic recordings of the chest and the heart measurements and the differential leucocyte counts. These need not be detailed here they showed no departure from what is usual in such cases.

H Harold Scott

MAZZA S & JAUREGUI R B Investigaciones sobre enfermedad de Chagas II Otras observaciones de primer período de enfermedad de Chagas en Las Lomitas [Chagas's Disease II In Las Lomitas] Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy) Publicación No 66 1943 48-52 4 figs

It would appear that the medical service in Formosa Territory is being reduced and the garrison is no longer stationed there. Prior to 1937 although the medical men had been told of the presence of Chagas's disease in the district they had not reported any cases. The

[May 1944]

houses were of a structure and in a condition to favour the multiplication of the Triatomid insects and further investigation was undertaken. As would be expected cases were found and three are recorded here: two in children of 2 years and one in a girl of 14 years. All three were typical.

H Harold Scott

MAZZA S. Comprobaciones de *Triatoma platensis* *Eutritoma oszardoi* *Panstrongylus* *seai* y *Psammolestes coreodes* en la provincia de Santiago del Estero todas ellas sin infestación y de *Eutritoma sordida* con infestación por *S. cruzi*; Otros datos sobre infestación esquizotripanósica natural silvestre de *Triatoma infestans* (Examination of (Argentine) *Triatomidae* for infection by *Trypanosoma cruzi*). Reprinted from *Prensa Méd Argentina* 1943 Aug 25 v 30 No 34 23 pp

The importance of this article rests in its negative records as much as in the positive. Professor Mazza has examined numerous *Triatomidae* for the presence of developing forms of *T. cruzi*; *Triatoma platensis* nymphs, larvae and adults have been examined in considerable numbers, some of them taken from the nests of birds, but none of them has been found positive. *Eutritoma sordida* was sometimes found infected (but not in all parts, e.g. the Department of Alberdi yielded negative findings) and at times in a association with *Triatoma infestans*. *Eutritoma oszardoi* which has been found infected in Jujuy Province has not been found positive in specimens collected elsewhere, e.g. parts of Córdoba. The Provinces of Catamarca and La Rioja. A specimen of *Panstrongylus seai* sent from S. Javier Department of Córdoba Province in 1939 as found heavily infected but examinations of others have proved negative. *Psammolestes coreodes* from Alberdi department from the Provinces of Santiago del Estero, Jujuy (Santa Barbara) and Campo del Cielo has been examined but none found positive. The result of the examinations of these and of *Triatoma infestans* are presented in a series of tables.

H Harold Scott

TOM V. A Modification of the N N Medium for cultivating *Trypanosoma cruzi*. *Amer J Trop Med* 1943 Nov 23 No 6 615-16

The following modification of the Novy and MacNeal medium for cultivating trypanosomes has the advantages that it uses less agar and is autoclaved. In comparative tests with PACKCHA's modification it was found to give equal and similar results. The trypanosomes remain viable for at least six months and were cultivated for ten successive generations.

Method of preparation—Infuse 500 gm. of fat free ground meat in 1000 cc. of water overnight at 4-6 C. heat gradually until the proteins are coagulated, cool, strain through gauze and add Bacto-peptone 10 gm. and NaCl 5 gm. Adjust to pH 7.4, boil for 20 minutes, cool, filter through paper and make up the volume to 1000 cc. Dispense and autoclave for 1 hour at 15 lb. pressure and store at 4-6 C. As required for use add 0.2 per cent agar and one-third of the volume of sterile defibrinated rabbit blood. Inspissate and autoclave at 15 lb. for 20 minutes. keep in the ice box (4-6 C.) overnight and incubate at 37 C. to test for sterility.

After inoculation with *T. cruzi* the tubes are rubber-capped and incubated at 25 C.

J F Corson

FULTON J D A Comparison of the Biological Action of Bayer 7602 (AC) and the Corresponding ICI Synthetic Product *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 164-73

Bayer 7602 (Ac) was described by IENSCH (1937) it consists of two 2 methyl 4 amino quinoline groups joined by a diallyl malonyl group in position 6 It has been used in the treatment of Chagas's disease due to *T. cruzi* clinical improvement results but it is doubtful whether all the trypanosomes of the patient are killed [For a review of the literature the original should be consulted]

The present experiments were performed with *T. cruzi* infections of young mice which were treated in an early stage of the infection The blood was subsequently examined at frequent intervals for three months Some ampoules of Bayer 7602 (AC) were available and the action of these was compared with that of samples manufactured by ICI Ltd The maximum tolerated dose of the ICI drug was 96 mgm per 20 gm mouse orally or subcutaneously (ulceration occurred) for both preparations it was 3 mgm intraperitoneally and 0.1 mgm intravenously When it was given to infected mice as 1-4 doses approaching the maximum tolerated amount the trypanosomes disappeared for a time but ultimately almost all the mice relapsed When given by mouth the drug was ineffective The drug has little value as a prophylactic to prevent infection There was no significant difference between the German and the British products The drug has no action on *T. rhodesiense* or *T. congolense* *T. Hawking*

LEISHMANIASIS

SUSSI AND S & ROTH J A Note on the Treatment of Two Cases of Infantile Leishmaniasis with Stilbamidine *Ann Trop Med & Parasit* 1943 Dec 31 v 37 Nos 3 & 4 158-64 3 figs on 1 pl

The two cases were in Palestine the first in a child 5½ years of age and the second in a child 10 years of age The first received two courses of stilbamidine and one of urea stibamine In the first course 38 intravenous injections representing 1.17 gm of stilbamidine were administered usually at intervals of two days, in a little under three months As the child developed whooping cough he was sent home where during the following month and a half 18 injections of urea stibamine each representing 0.03 gm of the drug were given The condition of the child deteriorated and he was readmitted to hospital where during the succeeding four months 87 injections of stilbamidine representing a total of 3.75 gm were given The individual doses varied from 30 to 50 mgm and were given daily except for an interval of 14 days in the middle of the course On two occasions during the first course attacks of bronchopneumonia occurred After the second course no further treatment was given the child being in good health two years later

The second case was not diagnosed as kala azar till three years after the initial symptoms In this case the stilbamidine was administered in 10 per cent solution of glucose—50 mgm in 10-12 cc The injections were given daily two hours after breakfast The following doses

were given 2 of 20 mgm 7 of 30 mgm 2 of 35 mgm 81 of 40 mgm 3 of 45 mgm 52 of 50 mgm The treatment was continuous during about five months except for two breaks of about six days each The child was in good health a year later

In the two cases the stilbamidine injections caused no serious reactions sometimes they were followed by abdominal pain or vomiting or transient severe headache Detailed accounts are given of the temperature variations and changes in the constituents of the blood and in the size of the spleen The two case are of interest on account of their severity and of the large amount of drug administered over a considerable period without ill effect

C M Henson

FEVERS OF THE TYPHUS GROUP

WEISS Lucile J Electron Micrographs of Rickettsiae of Typhus Fever J Immunology 1943 Nov v 47 No 5 353-7 24 figs

Yolk sac cultures of *Rickettsia prowazekii* with added formalin were ground and subjected to differential centrifugation A drop of the suspension was placed on a collodion film and washed with distilled water The organisms were photographed at a magnification of 6 000 diameters and the photographs were enlarged so that the illustrations are at a magnification of 21 000 diameters

The resultant images correspond with those obtained by Plotz and his collaborators (this Bulletin 1943 v 40 685) They show that the *Rickettsiae* are pleomorphic the large bacilli-form types show the presence of a limiting membrane enclosing a substance of moderate opacity to electrons in some cases spherical granules are seen within the organisms Some forms are completely opaque others are transparent Dividing forms occur these are opaque when division is nearly complete

Killed vaccines have also been photographed these contain complete *Rickettsiae* but also many small granules resulting presumably from disintegration of the organisms but possibly consisting of particles of protein or debris they vary in appearance according to the methods employed in preparing the vaccines

[The electron micrographs illustrated by Plotz showed sharper definition than those accompanying the present article]

John W D McArthur

GAASE A Titterschwankungen der Proteus O₁₅₇ Agglutination nach Weil Felix II Untersuchung en ueber die Ursachen der tagesspezifischen Titterschwankungen [Fluctuations in the Titre of the Weil Felix Reaction II Investigation into the Causes of the Diurnal Fluctuations] Ztschr f Immunitaet u Exper Therap 1943 Sept 8 v 103 No 5 419-24 14 figs

The titre of agglutination of *Proteus O₁₅₇* is known to vary according to the reaction of the suspension It is increased by a diet containing sugar and is diminished or abolished by traces of corrosive sublimate phenol or formalin It is raised by hydrochloric acid (1-3 000) and checked by carbonate of soda (0.5 to 1.0 per cent)

In the present experiments guineapigs were given intracardiac injections of *Proteus O\19* in three increasing doses and the resulting Weil Felix reactions were tested over a period of three weeks in the animals after fasting for 18 hours and 6 hours after food.

In every case the titres were much higher after fasting for example a titre of 1-200 was often found in the fasting animal against a negative reaction after food. The fluctuations that occur in the titre during the 24 hours must depend on the variations in the reaction of the blood caused by fasting and by food.

Guineapigs inoculated with killed *Proteus O\19* showed higher titres than those inoculated with living organisms. Animals fed entirely on lactose and galactose before being inoculated showed an earlier and higher rise in the titre than those fed on ordinary diets.

John W D Megaw

LEÓN A P & APODACA F. La reacción de Weil Felix por el metodo rapido en lamina. Su valor diagnostico. [The Diagnostic Value of a Rapid Slide Modification of the Weil Felix Reaction] *Rev Inst Salubridad y Enfermedades Trop Mexico* 1943 Sept v 4 No 3 227-37 1 fig [14 refs] English summary (9 lines)

The method employed was on the lines of the test introduced by HUDDLESON and ABELL (1928) for the diagnosis of brucellosis. It is described in detail.

The results obtained with high titre sera corresponded closely with those of the standard test. With low titre sera there were considerable divergences in many cases. Extreme examples were—slide test negative as contrasted with a Weil Felix titre of 1-160 and slide test titre 1-50 against a Weil Felix titre of 1-320.

The test is regarded as reliable though it is less sensitive than the standard test for titres below 1-200 and on the whole it is rather less sensitive than the tube reaction.

John W D Megaw

BARDHAN P N TYAGI N & BOUTROS K. Dry Blood Test for Typhus Fever. Preliminary Report. *Brit Med J* 1944 Feb 19 253-4

A rough modification of KUDICKE and STEUFERS dry blood a glutination test for typhus fever [see this *Bulletin* 1942 v 39 372] was carried out on 640 Egyptian labourers from various military camps. Two drops of blood of unstated size separated from each other by a grease pencil stroke were dried in the air on a glass slide. The slides were brought to the laboratory on the same day and were examined within 24 hours. Drops of concentrated suspensions of *Proteus O\19* and *Pr O\2* were placed on the blood films left for a minute and then well mixed with the films by gently rocking the slide. Mixing with a loop or other article was avoided. The slide was rocked occasionally for five to ten minutes and the result was read with the naked eye or a pocket lens. The positive reactions with *Pr O\19* were 13 of these two reacted also with *Pr O\2*. The positive cases were tested with the standard Dreyer technique for the Weil Felix reaction. 7 reacted with *Pr O\19* at titres of 1-250 to 1-2560 none reacted with *Pr O\2* at titres higher than 1-50. Three of these seven reactors were found to be suffering from typhus two were convalescents from the disease and two were not subsequently traced (but were considered to have typhus on the basis of the Weil Felix titres).

There was no explanation of the negative Weil Felix response in the six other slide-positive cases
Sera of 33 of the persons who were slide negative were subjected to the standard Weil Felix test none reacted to Pr O 119 at a higher titre than 1-25

From these findings the authors conclude that all typhus cases give a slide-positive result though a slide-positive result does not necessarily mean a positive case
[The test has great possibilities but it is desirable that the size of the drops of blood and suspension should be standardized at least roughly
The dry blood test would be a better name than the slide test because there are several rapid tests that are carried out on a slide

John H. D. Mac

LEHMERTHEIM H Hautreaktion bei Fleckfieber [A Dermal Reaction in Typhus Fever] *Ztschr f Immun (atsf u Exper Therap* 1943 Sept 5 103 No 5 397-419 2 figs [21 ref]

The author discusses the results of tests with the reaction described by GIROUD who found that the intradermal injection of 0.1 cc of typhus vaccine into typhus patients and convalescents caused the formation of a large patch of erythema up to 50 mm in diameter and reaching its maximum size in 28 to 32 hours. A patch of 9 mm after 30 hours is regarded as positive. Mouse-lung vaccine supplied by Giroird was used in the present series of tests. In normal persons there is a small patch which reaches a maximum size of 4-5 mm. The reaction becomes positive about the 9th day of the fever and remains positive for at least a year.

Reactions in various groups of typhus patients and convalescents also in control are shown in tabular form. The readings after 24, 48 and 72 hours are given.

Among 13 typhus patients and convalescents the patches were 11-60 mm in 63 and 6-10 mm in 5 after 24 hours.
The titre of the Weil Felix reaction and the duration of convalescence made no significant difference in the reaction. Six persons tested about a year after their attacks were still positive. Of 15 healthy controls two had patches of 11-20 mm after 24 hours. All were negative after 48 hours.

Five convalescents from trench fever were tested. Three had patches of 11-20 mm after 24 hours and one had a patch of 21-30 mm after 48 hours. Of 10 persons who had been inoculated against typhus four had patches of 11-30 mm after 24 hours. Two had patches of 2-5 mm and four of 6-10 mm. The reaction was rather less after 48 hours and only one had a reaction of 11-20 mm after 72 hours.

The reaction described by BICHROFF following the use of louse vaccine and found by him to be non-specific probably results from the albuminous substances derived from the tissues of the lice rather than from the Rickettsial content of the vaccine. John H. D. Mac

KAMAL A M & MESSIR G A Typhus Fever in Egypt. Statistical and Epidemiological 1905-1940. *J Egyptian Pub Health Ass* 1943 Dec. 73-1-4 12 charts & 2 maps.

The statistical records dealing with the incidence of louse borne typhus in Egypt are discussed in detail. The earlier figures are grossly

inaccurate for example a fatality rate of 78.6 per cent is shown in 1907 with better though far from perfect notification the rate has fallen to about 15 per cent in recent years

The recorded yearly deaths per 100 000 of population show the variations in prevalence of the disease. In 1911-14 the figure was 15 in 1915-16 it was 45 and in 1919-20 34. It then fell rapidly to the low figure of 1 for the years 1927-32 rose again to 7 in 1933-35 fell to 2 in 1936-38 and in the four years from 1939 onwards the figures have been 5 5 10 and 19. The rate for 1943 is not stated but from a graph it appears to have been almost double that for 1942.

The disease is shown to have been endemic in Egypt from the earliest period at which records are available. It is regarded by the authors as being chiefly rural in its incidence though the recorded yearly figures of deaths per 100 000 of population show considerable fluctuations. They are —

	1921-25	19 6-30	1931-35	1936-39
Urban	7.5	1.3	2.4	2.4
Rural	3.9	1.1	5.5	3.1

The disease is much more prevalent in Lower Egypt than in Upper Egypt. The annual attack rates have averaged 30 in the former and 6 in the latter from 1921 to 1939. The two Western Deltaic Provinces, Behera and Gharbia, have been the most heavily affected parts of the country owing to the yearly immigration of labour forces to the large agricultural estates where the workers live in crowded and insanitary conditions.

The incidence and spread of the disease have been strikingly associated with the congregation of labour forces and with the return of infected persons to their homes. This feature of the disease is well seen in Upper Egypt where there is little typhus apart from that originating in connexion with dam construction and irrigation work.

The seasonal prevalence is remarkably uniform. Cases begin to appear in November and increase steadily in number to a peak about the middle or end of April. The incidence remains high for about a month to six weeks. Towards the end of June there is a rapid fall and there is a 'dead period' from the end of August to the end of October.

In Upper Egypt the rise in incidence occurs rather later and is steeper. The decline is earlier and more abrupt. This difference is attributed by the authors to the importation of infection rather than to climatic conditions because the prevalence in Lower Egypt begins to decline when the mean monthly temperature reaches 25 to 26°C but remains high in Upper (South) Egypt while the temperature is nearly 30°C. The influence of climate on the incidence of the disease in Egypt deserves closer study. It is not likely that it can be stated in such simple terms as the mean temperature at a given time.

The prevalence of the disease since the outbreak of the present war is of special interest. The following figures show the number of cases notified in certain places —

	Cairo	Alexandria	S. Ports	Upper Egypt
1931 to 1939 (yearly average)	99	41	15	
1940	366	118	76	
1941	10	1	29	1 804
1942	4	522	281	3 234
1943 (till end of June)	778	158	1453	7 119

Before workmen were recruited from Upper Egypt in this war the number of cases there never exceeded 700 in any year.

This paper will be of great interest to epidemiologists in spite of the admitted unreliability of the notifications of the disease it shows clearly that typhus in war and peace in Egypt has conformed to the pattern observed in other countries in which the disease is endemic.

No cases of relapse in fever have been reported during the present war. In the period 1915-18 there were 36 343 cases.

John H. D. Meaw

KAMAL A. M. & MESSIH G. A. Typhus Fever (Review of 11 410 Cases) Symptomatology Laboratory Investigations and Treatment *J. Egyptian Pub Health Ass.* 1943 Dec. 125-85 3 charts & 8 pls. Appendices I-IV 186-96 3 charts. Temperature charts of cases 197-213. Ref. in footnotes.

This investigation deals with 11 410 cases treated in various Egyptian hospitals during the years 1937 to 1942 and includes 2 106 cases under the care of the second author at the Tanta Fever Hospital near Cairo. There were 547 deaths among the 5,324 male patients and 453 among the 6 086 female patients. The fatality rates in the different age groups were 3.9 per cent under the age of 20 rising steadily to 22 per cent for patients of 35-45 and 55.7 per cent for those over 55. The general rate was 13.38 per cent—it was higher in males than in females at all ages especially in the 25-35 group in which it was 15.8 in males and 9.98 in females.

The onset sometimes simulated malaria meningitis or influenza persistent headache was a special feature. The tongue became brown coated dry and cracked in almost every case. When asked to protrude the tongue the patient folds the tip—and then puts it out by jerks.

The pulse was rapid till early convalescence in most cases. Bronchitis of varying degree with rapid respiration occurred almost invariably.

There were great variations in the type and severity of the symptoms in the different local outbreaks. Many types of fever curve were seen these are well illustrated by a large series of temperature charts which form a valuable feature of the paper. The fever ended by crisis in 9.2 per cent by rapidly lysis in 36.8 per cent and by slow lysis in 14 per cent of the cases.

The frequency of the rash in different outbreaks seen by the same observer varied from 42 to 95 per cent of the cases. In one outbreak it was as low as 32 per cent. The time of appearance ranged from the 2nd to the 10th day—it was between the 3rd and 6th day in nearly 80 per cent of the cases with rash but was on or after the 7th day in a considerable number. It was rare on the face and palms and was best seen on the flexor aspect of the forearms. Petechiae were the most

characteristic and common forms they were usually independent of the macules but were sometimes superimposed on them

The more severe nervous symptoms seldom appeared till the 2nd week except in alcoholic patients. Delirium, hallucinations and delusions usually appeared late in the illness but insomnia was an early feature. Deafness in some degree was always present it never persisted longer than a month after defervescence.

The chief complications were bronchitis, bronchopneumonia and lobar pneumonia. 13.7 per cent of all the deaths were due to some form of pneumonia.

Parotitis occurred in 288 cases (25.4 per cent) mostly in early convalescence. suppuration has become rare now that sulphonamides are used. Diarrhoea occurred in 125 cases, uraemia in 26, pharyngitis in 23, gangrene in 21, otitis media in 17, neuritis in 11 and cellulitis in 10. The low incidence of some of these complications is striking. The incidence of pneumonias varied in different outbreaks from 1.7 to nearly 10 per cent. It was much less in cases brought early for treatment.

Of 87 pregnant women 54 aborted mostly in the 2nd week. The earlier the stage of pregnancy the more frequently abortion occurred.

In 684 cases at the Tanta Hospital Weil-Felix tests were carried out from the early stages. The reaction became positive within the first week in 30.7 per cent, during the second week in 40.8 per cent and in early convalescence in 14.1 per cent. It remained negative at the end of the third week in 14.3 per cent. The reaction is not considered to be absolutely diagnostic except in cases in which there is a titre rising to 1-500 but the titre which was regarded as positive in the above series is not stated. Among 639 cases in which the titre had been 1-250 or higher the reaction became negative 14 days after the end of the fever in 54.8 per cent, in 13 per cent the titre fell to 1-125 and in the rest it was still 1-250 or over. In 5 of 15 cases it was still positive after nine months but was negative after 12 months.

In 70 cases at the Tanta hospital in which the titre to O\19 was 1-250 or over there were reactions to O\12 and O\1A in only six and in these the titre was 1-50.

A skin test is mentioned as being of great diagnostic value but nothing is said of the stage at which it becomes positive. A loopful of a 24 hours culture of *Proteus* O\19 is suspended in 20 cc. saline and killed by heat. 0.2 cc of this is injected intradermally. In normal persons this causes an indurated patch of erythema after 12 to 16 hours in typhus patients there is no reaction.

About 26 per cent of the deaths occurred after defervescence. No drug was found to have any specific action though many were tried. No evidence could be found of the existence of inapparent cases. There was carry-over of infection is believed to be by sporadic cases. There was no evidence of any outbreak having originated from flea borne typhus.

The best way of destroying head lice was that suggested by Professor Buxton: the hair was well soaked with 2.5 per cent carbolic acid and kept covered with a towel for two hours.

John W D Megaw

BROCKBANK W & WHITTAKER S R F. Notes on Typhus Fever in the Middle East. *Lancet* 1944 Jan 29 150-51.

Ten cases of louse borne typhus fever were treated at a General Hospital in the Middle East during the three months March to May

[May 1944]

of having had typhus previously did not develop it and showed no evidence of immunity. Lice taken from him in February were not infective and healthy lice fed on him did not become so. Guinea pigs developed typhus as a result of the inoculation of either live or dead lice taken from the mattress of a typhus patient 25 days after his removal to hospital.

A brief account is given of the benign endemic typhus of Antiofagasta. The sick were usually free from ectoparasites. Rats were proved to be reservoirs and the disease was transmitted from rat to rat by *Polyplax spinulosa* Burm and *Xenopsylla cheopis* Roths (musculi Dugès). *Cimex lectularius* L. [*Leptopsylla*] sensu Schönb. (*Liponyssus bacoti* Echinophaga gallinacea Westw. *Pulex irritans* L. *Liponyssus bacoti* Hirst and *Echinolaelaps* (*Laelaps*) *echidninus* Berl. were negative. Examples of *Dermacentor Ornithodoros* *Rhipicephalus sanguineus* Latr. and *Ctenocephalides* (*Ctenocephalus*) *canis* Curt. collected from dogs were not infected.

SEGAL A. E. & ZASOPOVA L. I. [Repeated Illnesses with Typhus Exanthematicus.] *Klinicheskaya Meditsina* Moscow 1943 v. 21 No 3 64-7 [In Russian]

During recent years the authors have noticed an increase in repeated attacks of typhus. During four years (1936-39) they have had 119 examples of second attacks which constitute 31.2 per cent of the total cases of typhus seen. 76.1 per cent of the second attacks have occurred between the ages of 26 and 50. The average interval between the first and second attacks was 12-18 years. It has been proved in guinea pigs that immunity to typhus varies greatly and it seems that man's immunity is far from absolute.

Comparing the second attacks with first the authors conclude that the clinical picture and the condition of the blood and serum are some what different. On the whole there are many more mild and indefinite cases in second attacks and the mortality is lower. The cardio-vascular system is less often affected in second attacks (46.2 per cent) and the same applies to the central nervous system. Usually a leucocytosis is claimed to be present in all cases but the authors experience was a leucopenia in 34.8 per cent a normal count in 26.8 per cent and a leucocytosis in 19.3 per cent. The Weil-Felix reaction as found positive in only about 20 per cent of cases after repeated attempts. In 18 per cent *Bact. typhosum* and *Bact. paratyphosum* B were also isolated. Complications (broncho-pneumonia and pyelitis) occurred in 19 per cent of cases only 5.8 per cent had no rash. H. H. SWANN

HASE A. Ueber Entlausung durch Ameisen sowie ueber die Wirkung der Ameisensaure auf Kleiderlaese [Delousing by Ants and the Action of Formic Acid on Clothes Lice.] *Ztschr. f. Parasitenk.* 1942 v. 10 Pt 6 663-77 7 figs. [Summary taken from *Revue Applied Entom.* Ser. B 1943 Dec 31 Pt 10 233]

The use of ants to destroy *Pediculus humanus* L. in clothing is an old practice in Germany and in experiments with artificially infested fabrics placed on nests of lice eggs and excreta were removed or eaten in 24 hours by *Lasius fuliginosus* Latr. while *L. flavus* L. cleared off all the lice and nearly all the eggs. *Formica rufa* var. *rufopretensis*

Forel destroyed the lice eggs and excreta but damaged the fabric. Such treatment is uncertain however and is ineffective if the lice are protected by folds in the material. The author also examined the toxic effect on lice of formic acid in view of a recent recommendation in Germany that clothes should be treated with a preparation containing 25-27 per cent of the acid and sold as Formazin. The lice were killed by immersion for 10 minutes in a 25 per cent solution of the acid but some eggs survived 20 minutes immersion and exposure to a high concentration of the vapour of formic acid killed the lice in three hours but not the eggs. Acetic acid gave similar results. It is concluded therefore that formic acid is not suitable for the treatment of clothing especially as there is danger of skin irritation from its use.

PENFOLD J B Vaccination against Typhus Fever *Brit Med J* 1944 Jan 22 114

The Proteus agglutination titres of 23 healthy persons were tested before and after vaccination with the usual three doses of Cox's egg yolk vaccine. They were also tested after revaccination three months later with a single dose of 10 cc of the same vaccine. The positive results at the titres indicated are shown in the table. The reactions were negative or at lower titres in the other cases. All the 23 persons were tested on each occasion.

	Before vaccine	2 weeks after vaccine	3 months after vaccine	2 weeks after revaccination
P OX19 (1-20 to 1-160)	3 (all 1-20)	13	8	19
Pr OX (1-20 to 1-80)	1 (1-20)	10	2	12
Pr OXK (1-80 to 1-640)	8 (maximum 1-160)	2	2	5

With Pr OAK 20 of the 23 reacted at titres ranging from 1-20 to 1-160 before vaccination. The commonest titre was 1-40. The titre for OX19 rose by more than 100 per cent after primary vaccination in 14 cases and after revaccination in 17 cases. The reactions to the vaccine were slight in most cases and they became progressively milder after each successive dose. The vaccine was issued from the Connaught Laboratories Toronto on November 4th 1941.

John W D Megaw

PATEL N D Endemic Typhus Fever in Bombay City. A Report of Six Cases with Demonstration of Neill Mooser Reaction and Rickettsiae from One Case. *Indian Physician* 1943 Nov v 2 No 11 384-99 7 figs (4 on 1 pl) [10 refs]

Six sporadic cases of endemic typhus are described. They occurred in Bombay City between July and October 1943. With the cases reported by T B PATEL in 1939-40 [this *Bulletin* 1940 v 37 840 *Indian Med Ga* 1940 v 75 650] and by J C PATEL early in 1943 [this *Bulletin* 1944 v 41 118] there are now records of 26 cases in Bombay. Two of these were fatal. From one of the patients in the present series Rickettsiae have been recovered by inoculation of blood taken on the 9th day into a guinea pig which had been kept on a vitamin deficiency diet. There was a positive scrotal reaction in the animal. From a mouse inoculated

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on the same day the infection was passed to a guinea pig which also developed a scrotal reaction. Rickettsiae were found in large numbers in scrapings of the tunica vaginalis of the guinea pig.

Guinea pig inoculation with blood taken from another patient on the 14th day of the illness gave no reaction.

The *Proteus* OX19 titres ranged from 1-50 on two separate occasions in the one fatal case to 1-2500 on the 17th day in the patient from whom Rickettsiae were isolated. It was 1-250 or 1-500 in the other cases. In the fatal case the OXA titre was 1-250. This patient was a girl of 14. Her leucocyte count ranged from 3700 to 4900. She died on the 27th day of pneumonia.

The author believes that all the conditions for a serious epidemic of louse borne typhus exist in Bombay. He states in italics that a mere accident of a louse infested man being infected with murine typhus may start such an epidemic.

[On the other hand it seems likely that flea borne typhus may have been prevalent for an indefinite period in Bombay and many other places in India without having given rise to an epidemic of louse-borne typhus. The remarkable freedom of the greater part of India from the louse borne disease has not yet been accounted for.]

John W. D. Meaurio

BEJARANO J. F. R. Rickettsiosis de la provincia de Santa Fe.
[Rickettsiosis of the Province of Santa Fe (Brazil)] *Primer Congreso Nacional de Enfermedades Endémicas* Buenos Aires 1941
Nov. 9-13 1941 1 map [24 refs.]

Occasional cases of typhus fever have been reported from San Martín in the Province of Santa Fe since 1936 but the first confirmed cases were in 1940. In one of these the Weil-Felix titre to *Proteus* OX19 was 1-200. In the other it was 1-1000. The reactions to OX2 and OXA were negative in both. Altogether 33 cases have been reported during the six years 1937 to 1942 from a restricted area within a radius of 40 kilometres. The inhabitants were clean and well nourished. It could be excluded so that fleas and ticks were the only arthropods that could be suspected of being vectors. In the cases investigated at the Bacteriological Institute at Buenos Aires the Rickettsiae were regarded as being of the murine type.

The author prefers to call the disease Rickettsiosis rather than exanthematic fever or exanthematic typhus and he adopts the classification according to the four arthropod vectors. He goes on to subdivide the tick borne fevers into two groups: the American and the African Mediterranean.

He implies that the tick borne disease does not occur in the Asiatic region.

John W. D. Meaurio

SORDELLI A. MANZULLO A. RIESSEL M. & FERRARI J. Resultados de la inoculación experimental con sangre de enfermos, ratas y pulgas con artrópodos. [Results of Experimental Inoculation with the Blood of Patients, the Organs of Rats, Fleas and other Arthropods.] *Primer Congreso Nacional de Enfermedades Endémicas* Buenos Aires 1941 Nov. 9-13 1941-9

Rickettsiae were isolated from 6 of 13 patients in whose cases the diagnosis of typhus fever was clinically confirmed. The patients came from Buenos Aires, Santa Fe and Córdoba.

Guineapigs were the animals chiefly used for the inoculation experiments and in them the reactions were unusual for strains of Rickettsiae of the murine type. Among 86 guineapigs inoculated with material known to be infective the Neill Mooser scrotal reaction was positive in only six cases. The usual response to inoculation was negative so far as a febrile or other apparent reaction was concerned and when fever occurred there was only a fleeting slight rise in temperature.

By intraperitoneal inoculation of rats with blood on successive days Rickettsiae were obtained in the tunica vaginalis but even with scrapings from this material rich in Rickettsiae it was not possible to pass the infection through guineapigs with regularity or to produce a scrotal reaction.

Three of the positive results were in patients from whom the blood was taken on the 13th to the 22nd day and the Weil Felix titres to OX19 were 1-500 to 1-1 000. In the other three cases the blood was taken on the 4th to the 6th day and the Weil Felix reaction presumably tested on the same days was still negative.

Evidence was obtained that Rickettsiae could be isolated more readily from rat fleas than from the rats that harboured the fleas. In the cases from which Rickettsiae could not be isolated the blood was taken between the 7th and 13th days. The Weil Felix titre was 1-200 in three, 1-1 000 in three and not stated in the remaining case.

[This is another group of cases in which the results of animal experiments were ambiguous. It would be interesting to test the sera of the patients by the Rickettsia agglutination and the complement fixation reactions.]

John H. D. Megaw

1 Sosa H & Vidal de Gambino R. Resultados de la investigación sistemática de aglutinas para *Proteus* X 19 [Results of a Systematic Investigation of the Agglutination of *Proteus* X 19] Primer Congr. Nac. Enfermedades Endemo Epidémicas Buenos Aires 1942 Nov 9-13 207-10 1 chart

11 — & — Resultados de la investigación sistemática de aglutininas para *Proteus* X 19. *Rev. Inst. Bacteriológ.* Dr Carlos G. Malbran Buenos Aires 1943 Sept 11 No 4 429-33 1 chart

1 Altogether 16 750 sera were tested first by a rapid simple method to pick out the positives then the titres were determined in the positive cases by the standard test. There were 130 positive reactions of which 106 occurred during three years 1940 to 1942.

Every sample of serum sent to the laboratory for the investigation of a febrile illness was tested from the year 1934 onwards. The percentage of positive reactions to *Proteus* OX19 ranged from 0.23 in 1937 to 2.0 in 1942. Of the positive cases 61 came from the City of Buenos Aires, 35 from the Province of Santa Fe and 16 from the Province of Córdoba. The rest were from six different Provinces of Brazil.

The reactions at titres of 1-50 and 1-100 were 29 at 1-200 24 at 1-500 to 1-1000 40 and at higher titres 37.

The method employed in carrying out the rapid test is described but the great increase in the number of positives from 1940 onwards and especially during the first seven months of 1942 is not discussed. During these seven months there were 38 positive findings.

The only reference to the type of disease in which the reactions occurred is contained in the introductory paragraph in which the work is stated to be a contribution to the study of endemic typhus.

John W D Mc a

SORDELLI A MANZULLO A RIESEL M A & FERRARI J Tifus exantemático III Virus de las pulgas de ratas de la ciudad de Buenos Aires [Exanthematic Typhus The Organism in Rat Flea in Buenos Aires City] *Rev Inst Bacteriol* Dr Carlos G Malbran Buenos Aires 1943 June 11 No 3 272-8: 3 text figs & 4 figs on 2 pls

Rickettsiae were isolated from 6 of 12 lots of suspensions of *Xenopsylla cheopis* found on rats caught in granaries situated in localities where cases of murine typhus had occurred.

All the fleas from each locality were ground up together & inoculated into white rats from which 12 to 19 days later a substance or this with vaginal scrapings were used for the inoculation of guinea pigs or irradiated rats.

The results were highly irregular just as were those obtained by the authors in their experiments with the blood of patients [see this Bulletin 1943 40 385].

Altogether 23 sets of passages were made from six of these Rickettsiae were isolated in four the results were doubtful and in 13 they were negative. Thermal reactions over 40°C occurred in 57.4 per cent of the 69 guinea pigs of the 13 negative sets of passages and in 51.3 per cent of the 86 used in the six fully positive series.

There were only eight scrotal reactions that did occur were the positive series. The thermal reactions that did occur were irregular in their duration and in the incubation period there was no regular association between their occurrence and the scrotal scrapings of Rickettsiae were recovered directly from the vaginal scrapings of only one of the eight guinea pigs with scrotal reactions but irradiated rats inoculated intraperitoneally with daily doses of the blood of these animals yielded abundant Rickettsiae in five other series.

The significance of the remarkably low virulence of the Rickettsiae to the local guinea pigs is discussed. The local animals appear to offer a high degree of resistance as is shown by the fact that infective material derived from 10 guinea pigs sent from Santiago after inoculation with a typically orchitic strain of Rickettsiae gave the same feeble and irregular results in the local guinea pigs as were observed in animals inoculated with the local strains.

John W D Mc a

1 SORDELLI A MANZULLO A RIESEL M A & FERRARI J Tifus exantemático III Virus de las pulgas de ratas del foco de Ucacha Pcia de Córdoba [Exanthematic Typhus Virus in Fleas and Rats from the Infected Focus of Ucacha] *Rev Inst Bacteriol* Dr Carlos G Malbran Buenos Aires 1943 June 11 No 3 376-48 4 figs on 2 pls & 2 text figs [24 refs]

2 ——— & ——— Breve estudio de un foco rural de tifus exantemático [A Brief Study of a Rural Focus of Exanthematic Typhus (Flea borne)] *Primer Congreso Nacional Enfermedades Endémicas* Buenos Aires 1942 Nov 9 13 207-4 1 fig

3 A remarkable outbreak of a mild form of endemic flea borne typhus is reported from Ucacha in the Province of Córdoba in Brazil

In a house of eight rooms in a once prosperous but now depressed agricultural colony 7 of the 12 adult residents were attacked between March 1st and May 3rd 1943. Seven children under five years of age escaped.

The incidence according to the rooms occupied and the dates of onset was: Room 2 two cases March 1 and April 5; Room 3 two cases April 12 and 18; Room 4 two cases April 12 and 15; Room 8 one case May 3. The only persons occupying these rooms who escaped were three children aged 1, 3 and 4 years. The nine persons living in the other rooms were not attacked and no other cases occurred in the locality.

The house was heavily infested with rats which made their nests under the wooden floors. There was no infestation with lice but bed bugs were plentiful.

Between April 29 and May 6 about 40 rats were trapped in the house and 200 fleas (*Xenopsylla cheopis*) were collected from them.

Rickettsiae were isolated from six lots of pooled rats each lot consisting of one to five rats and from four lots of fleas each lot consisting of 14 to 116 insects.

The investigation was carried out on the same lines as described in the above article by the same authors and the findings were very similar. A scrotal reaction occurred in 12 of 122 guineapigs inoculated with material from rats known to be infective and in five of 58 animals inoculated with material from fleas known to be infective.

u This paper refers to the same outbreak. John W. D. Megaw.

SORDELLI A. MANZULLO A. RIESEL A. & FERRARI J. Tifus exantemático. IV. Infección *Polyplax* sp. y *Cimex lectularius* con *Rickettsiae* [Exanthematic Typhus. Infection of *Polyplax* sp. and *Cimex lectularius* with *Rickettsiae*]. *Rev. Inst. Bacteriológ.* Dr. Carlos G. Malbran. Buenos Aires 1943 Sept. v. 11 No. 4 381-4. 1 coloured pl.

From a pooled suspension of 30 lice from a rat trapped in Buenos Aires *Rickettsiae* were isolated in an irradiated rat belonging to a series of 36 animals (guineapigs and rats) used for the passage of the infection. A rat also gave a positive Weil-Felix reaction. Fleas from the same rat gave negative results on inoculation.

Rickettsiae were also isolated from bed bugs collected on April 30th from the beds of two patients during the Uchacha outbreak described in the preceding article. *Rickettsiae* from tunica smears made from an irradiated rat which developed a scrotal reaction are shown in a coloured plate.

These findings are not regarded by the authors as being of great practical importance.

John W. D. Megaw.

BRICEÑO IRAGORRY L. Comprobación de la *Rickettsia prowazekii* var. Mooseri en el cerebro de ratas de la región caraqueña [Confirmation of the Presence of *Rickettsia prowazekii* var. mooseri in the Brain of Rats in Caracas, Venezuela]. *Gac. Méd. de Caracas* 1943 Sept. 15 v. 50 No. 17 187-9.

All the previous attempts by the author to isolate the *Rickettsiae* of the cases of murine typhus in Caracas have been unsuccessful owing to the late stage at which the patients came under observation.

Investigation of the rats of infected localities also gave negative results except that the Weil Felix reaction was found to be positive in 62 per cent of the animals.

During the early months of 1943 the brains of 125 rats from infected localities have been examined by guinea pig and rat inoculation.

Rickettsiae were isolated from one rat (*Rattus norvegicus*) and were passaged through a white rat and two guinea pigs all of which showed scrotal reactions. Rickettsiae were demonstrated in tunica smears of the infected guinea pigs.

John H. D. McArthur

GIBBONS R. J. Rocky Mountain Spotted Fever in Canada. *Proc 6th Pacific Sci Congr 1939* Berkeley Calif 1940 v 5 573-5 [Summary taken from *Re Applied Entom Ser B* 1944 Jan v 3? Pt 1 10-11]

Of the 12 authenticated cases of Rocky Mountain spotted fever that have been recorded in Canada three occurred in British Columbia in 1917 and 1936 eight in Alberta in 1923 1935 1936 and 1938 and one in Saskatchewan in 1939. There have been several other cases with clinical histories suggestive of this disease. *Dermacentor andersoni* Stiles is abundant in the dry belt of British Columbia east of the Coast Range and throughout southern Alberta and south western Saskatchewan and has been recorded from Manitoba. It is slowly spreading westwards in British Columbia. It becomes active in late March and remains so for 1-3 months according to district. No cases of Rocky Mountain spotted fever have been recorded from eastern Canada although *D. variabilis* Say which transmits it in the eastern United States is found in Manitoba parts of Saskatchewan and a few districts in Ontario and has been reported as far east as Labrador. *Haemaphysalis leporis-palustris* Pack believed to be of importance in the maintenance of *Dermacentor* ticks in animals is the most widely distributed tick in Canada and individual collected in northern Manitoba induced reactions indicative of low grade Rocky Mountain spotted fever in guinea pigs. During the spring and early summer of 1938 and 1939 29 500 and 72 600 ticks respectively nearly all *Dermacentor andersoni* were collected in southern British Columbia and southern Alberta. No infections with Rocky Mountain spotted fever were found in those collected in 1938 but typical strains of virulent *Dermacentor variabilis rickettsi* were demonstrated from five out of about 300 lots comprising 9 000 ticks in 1939. All the positive ticks came from an area in south eastern Alberta where fatal human cases had occurred in 1935 and 1936 though the negative ticks of the previous year had included many from this district. Tularemia bacteria were isolated from several of the ticks in both years.

VAPELA G & MAZZOTTI L. Conservación del virus del tifo en *Triatoma barberi* Usinger 1939 [Survival of the Typhus Virus in *Triatoma barberi* Usinger 1939] *Rev Inst Salubridad y Enfermedades Trop Mexico* 1943 Sept v 4 No 3 211-13 English summary (3 lines)

Twenty *T. barberi* which had fed on a guinea pig infected with an orchitic strain of Rickettsiae were triturated on successive days and injected intraperitoneally into guinea pigs.

The results were somewhat irregular but the last guinea pig inoculated on the 33rd day had a short febrile attack and was found to be immune.

to the same orclutic strain so that the virus was shown to be capable of survival in the insect for at least 33 days John W D Megau

DAVIS G F Studies on the Biology of the Argasid Tick *Ornithodoros nicolleti* Mooser J Parasitology 1943 Dec v 29 No 6 393-5

The argasid tick *Ornithodoros nicolleti* found in the states of Guerrero Puebla Colima and Jalisco Mexico feeds naturally on *Neotoma* man and dogs It also feeds readily on laboratory animals Feeding is rapid with the exception of some larvae which may require several days to complete engorgement Males mature first There are from 4 to 6 nymphal stages Based on 42 counts the number of eggs varied from 184 to 631 The number of eggs increases from the first to the third or fourth oviposition There is a tendency to oviposit a second time without further feeding Fertility was as high as 98 per cent in females that had not mated for at least one year

Ticks of this species experimentally transmit the rickettsiae of the spotted fevers of the United States of America Colombia and Brazil with marked facility Transmission through the egg was demonstrated in Brazilian and Colombian spotted fever *Rickettsia diaporica* and *Pasteurella tularensis* are not transmitted by bite but are conserved for long periods in the tissues of the tick as demonstrated by injection

DAVIS G E Experimental Transmission of the Rickettsiae of the Spotted Fevers of Brazil Colombia, and the United States by the Argasid Tick *Ornithodoros nicolleti* Pub Health Rep Wash 1943 Nov 26 v 58 No 48 1742-4

Eight lots each consisting of 20 to 76 specimens of the tick *Ornithodoros nicolleti* were fed at the first nymph stage on guineapigs infected with the spotted fevers of Brazil Colombia and the United States respectively

Some of the engorged nymphs belonging to six of the eight lots transmitted infection to fresh guineapigs by their bites The scrotal reaction was caused in about one third of the infected guineapigs and all the infected animals that were tested were found to have acquired immunity to the spotted fever of the United States

Transmission of infection through the egg was demonstrated in ticks infected with the Brazilian and Colombian strains of Rickettsiae The larval offspring of the infected ticks appeared to be more effective transmitters than their parents they caused more severe attacks and attached themselves more firmly to the guineapigs

O. nicolleti is a Mexican species and is parasitic on man and dogs so that it seems hardly credible that Mexico should be free from the tick borne spotted fever which has so wide a distribution in North and South America yet no cases of the disease have yet been reported from Mexico

This report like the others from the Rocky Mountain Laboratory gives a highly condensed but clear account of a large series of carefully conducted experiments so that its readers will observe with regret a hint that the work has been interrupted probably owing to the exigencies of war

[The nomenclature of the tick borne fever of the typhus group prevalent in so many parts of the American Continent ought to be unified and it is to be hoped that a suitable descriptive name will be selected

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basis of new data from various sources including the author's own observations. The disease is widely distributed on the main island in the mountainous regions (6 500 ft above sea level) as well as in the plains but the endemic areas are more or less localised. It occurs throughout the year but chiefly between June and October and is contracted mainly by adult males in the course of work in the fields. Between 1933 and 1938 the incidence showed a tendency to decrease. The percentage mortality for this period was 12. The only known vector is *Trombicula akamushi* Brumpt which feeds on man and other mammals chiefly rats and mice and also birds during the larval stage. The eggs are laid in the ground. The causal organism of the disease is passed from the larvae of one generation to those of the next. It is thought that not all the hosts of the mite can act as reservoirs of the disease. The most important are probably *Mus* (*Rattus*) *losea* and *Apodemus* *varius*. The correct specific name for the *Rickettsia* that causes tsutsugamushi disease with those of northern Japan but show some biological differences particularly as regards their behaviour in rabbits in which scrotal swelling has never been observed by the author. It is difficult to detect the rickettsiae from Formosan cases unless mice are used. The author is of the opinion that the Formosan type may be a variety or at least a local variation of tsutsugamushi disease.

The disease was discovered in the Pescadores Islands in 1931 but was certainly present earlier. It is contracted from April to November in areas surrounding human dwellings and is most prevalent in children. The percentage mortality for all observed cases was only 5.6. It is not known to be contracted in fields remote from habitations as it is in the main island probably on account of the peculiar meteorological conditions. A very strong monsoon carrying salt spray blows during the winter and causes plants to wither unless they are artificially protected. For this reason the inhabitants protect some area near their homes with coral walls. *Mus* (*P*) *rattus* *rufescens* *M* (*R*) *nortegicus* and *M. musculus* *laurianus* live in or near the dwellings and these walls and *Trombicula akamushi* develops in the ground inside the walls. *M. rufescens* has been found heavily infested by the mite and rickettsiae have been demonstrated in its tissues.

DENGUE

CAVANAGH J R Dengue Observations on the Disease as seen in the South Pacific Area War Medicine Chicago 1943 Dec 14
No 6 549-55 3 charts

In a large series of cases of dengue in the South Pacific the following symptoms are observed (the figures in brackets are percentages) —
Backache usually persistent (9) retro-bulbar pain (88) severe frontal headache (86) periarticular joint pains (70) chill at onset (60) nausea (45) sore throat (28) pruritus (21) pain on left side of abdomen (17) and omitting (13). The physical signs often affected were the cervical and epitrochlear lymph glands most often affected and tenderness of lymph glands (68) morbilliform rash (46) bradycardia (45).

The fever curve was of the two-phase type in 51 per cent of the cases the first febrile spell usually lasted two days the second occupied the fourth and fifth days. In a small percentage of cases there was a third rise to about 100 F on the 8th or 9th day. A type of curve often seen was an initial rise to 103 or 104 F followed by a gradual fall to normal which was reached on the 7th or 8th day. Irregular curves simulating malaria were seen in some cases.

The leucocyte count was below 4 000 in 34 per cent below 5 000 in 56 per cent and below 7 000 in 91 per cent of the cases. The days of the disease on which the observations were made are not stated.

Many cases occurred among the hospital staff.

There seemed to be a temporary immunity.

Mental depression and insomnia lasting three to six weeks followed the attacks in nearly all the cases.

The severity of the attacks in each outbreak tended to be rather uniform but it varied greatly in the different outbreaks.

The author points out that many cases are missed by medical men who are not dengue conscious.

Treatment was purely symptomatic the patients were encouraged to drink plenty of fluids.

The usual measures of prevention were adopted. The men were instructed to make an immediate report of any feeling of indisposition so that they might be placed under control during the early infective stage of the illness.

John W D Megaw

HYMAN I S. *The Heart in Dengue. Some Observations made among Navy and Marine Combat Units in the South Pacific War Medicine Chicago 1943 Nov 4 No 5 497-501 [10 refs]*

The condition of the heart was studied in a large number of cases of dengue in the combat area of the South Pacific during 1942-1943. The slow pulse was found to be due to a simple sinus bradycardia probably the result of autonomic involvement by the virus.

Electrocardiograms showed a delay in the P R interval and widening of the Q R S complex other minor changes (in the T waves and R T segments) occasionally occurred. Various types of systolic bruits were often heard but these disappeared during convalescence. Low blood pressure was almost invariable this persisted for some time after the attacks.

No important changes were detected by X ray examination.

The cardiovascular symptoms corresponded in many respects with those already described by the author as occurring after influenza and as attributable to vagotonia. It is suggested that atropine or belladonna may have a place in the treatment both of the cardiac symptoms of dengue and of the physical depression which follows attacks and is often responsible for delayed convalescence.

John W D Megaw

PLAGUE

DE VILLAFANE LASTRA T GOOBAR J K & WOLAJ I F Epidemiologia de la peste en la provincia de Cordoba [Epidemiology of Plague in Cordoba Argentine] *Primer Con r Nac Enfermedades Endemo Epidémicas Buenos Aires 1942 Nov 9-13* 594-6

The authors set out the arguments for the existence in Córdoba of sylvatic plague and its difference from the ordinary rat plague. The field rodents concerned as has now often been pointed out are *cuis* coney and *Graomys*. They conclude (1) It is not possible to regard the rat as being the sole reservoir of plague in spite of its being the chief agent in large epidemics. (2) Plague evidently exists in latent form in the forest and agricultural regions of the north and north east and these regions evidently constitute a huge source of infection among the sylvatic rodents. (3) The majority of the human cases of the north and north east regions of Córdoba are due to these rodents. (4) Sylvatic plague is uncontrollable in the actual circumstances and constitutes a permanent focus of the disease capable of promoting the murine epizootic and thus menacing the urban centres.

W F Harvey

MEYER K F HOLDENRIED R BURROUGH A L & JAWETZ E Sylvatic Plague Studies IV Inapparent Latent Sylvatic Plague in Ground Squirrels in Central California *J Infect Dis* 1943 Sept-Oct v 73 No 2 144-57 3 figs [23 ref.]

An early problem in the epidemiology of plague was the explanation of how the disease was carried over from season to season in the rodent population. It became evident that plague persisted in enzootic areas but the Indian Plague Commission disposed of the idea that chronic or resolving rat plague was concerned in the process. Much more light on the matter has come from investigations into sylvatic plague with its underground persistence and its widespread existence without much development of either rat plague or human plague. The authors discuss the significance and importance of the discovery of plague in an area of the Calaveras Reservoir, California where for the past three years a population study of the ground squirrel (*Citellus beecheyi*) has been in progress. Latent plague has to be distinguished from chronic plague. The former represents a stage of survival of plague bacilli in the tissues of wild rodents. Such latency has been proved but in order that the disease may become propagated among rodents there must develop a plague bacteraemia before vector fleas can become infected. In the present research it has been shown that gross macroscopic lesions are not necessarily present in rodents affected with latent plague and that surveys depending entirely on such examinations are not only incomplete but in fact futile. From the data it appears not unlikely that the persistence of a latent infection in the Beechey ground squirrel is probably confined to a short period of one or two months. In this type of plague there are no inflammatory and no encapsulating lesions. There may however be occasional bacteraemias in the affected squirrels which provide an opportunity for fleas to become infected and thus a slumbering and latent plague enzootic is maintained in existence. In the area under survey examination of 259 squirrels shot during July and 117 killed

in August revealed no lesions generally considered indicative of plague. The spleen, liver and lymphatic nodes from four to five squirrels were pooled, pulped, suspended in salt solution and injected subcutaneously into guinea-pigs. During a period of four months a total of 94 pools from 440 squirrels were tested. Fifteen of the pools induced fatal plague infection in guinea-pigs. During September and October on the other hand testing of organ pools furnished completely negative results.

MILMORE B K. Harborage of *Rattus rattus alexandrinus*. *Pub Health Rep Wash* 1943 Oct 8 v 58 No 41 1507-9 [16 refs]

Contrary to the general belief that *R. r. alexandrinus* inhabits only upper parts of buildings, the observations presented show that this species sometimes burrows in the ground and may be encountered under buildings and in basements and sewers. Most descriptions overemphasize the differences in harboring habits of the common species of rats.

DE VILLAFANE LASTRA T & RODEIRO M. El edema regional en la peste (Nota previa) [Regional Oedema in Plague]. *Primer Congr Nac Enfermedades Endemo Epidemicas Buenos Aires* 1942 Nov 9-13 568-9

In plague two chief varieties of oedema occur: one acute, hot, without pitting, and the other chronic, residual, deforming the locality without alteration of the skin. The latter has to be differentiated from the oedema of lymphogranuloma inguinale and is exemplified by two cases described by the authors in which plague cultures were positive and the Frei test negative. As both diseases may exist in the same locality, the diagnosis is sometimes difficult.

DE VILLAFANE LASTRA T & RODEIRO M. Estudio de la meningitis pestosa [Plague Meningitis]. *Primer Congr Nac Enfermedades Endemo Epidemicas Buenos Aires* 1942 Nov 9-13 579-80

The authors have met with four cases of meningeal plague as a complication of the bubonic type, although one of these patients also developed a septicaemia. Symptoms were delirium, excitement, mental confusion, headache, hallucinations, disorders of speech, neck rigidity, Kernig's sign and cerebrospinal fluid under pressure. Similar symptoms may occur in various infections such as brucellosis, typhoid and pneumonia with relative frequency and without great significance. Nevertheless it must be noted that in plague these symptoms do not have a favourable significance and usually indicate the beginning of true plague meningitis, which is fatal. In meningeal cases with clear cerebrospinal fluid culture has been negative for *P. pestis*. The four cases of plague meningitis studied all showed purulent turbidity of the spinal fluid and afforded plague cultures. Since the authors began to study particularly the nervous system in plague cases with a complete examination of the cerebrospinal fluid, they have discovered four cases of plague meningitis out of 39 hospital admissions for plague and they believe that a meningeal localization of the plague bacillus would be found with greater frequency if such systematic examination were carried out more often.

W F Harte

DE VILLAFANE LASTRA T GOOBAR J K RODEIRO M & VIDELA L F Tratamiento de la peste d Oriente [Treatment of Plague] *Primer Con r Nac Enfermedades Endemo-Epidémicas Buenos Aires 1942 Nov 9-13 586-93 9 figs*

The statistics on which pronouncement is based were —a mortality of 70.87 per cent during 1940 when serum was sometimes employed on a large scale and of 23.33 per cent for 39 patients treated with cibazol (sulphathiazole). The latter figure of 23.33 per cent is more correctly reduced to 14.28 per cent when four of the patients who died within the first 24 hours of admission to hospital are excluded. All cases were true plague infections proved bacteriologically. The failure of previous trials of sulphanimide and sulphapyridine have convinced the authors that sulphathiazole is the treatment of choice in plague. They place no faith in the utility of serum treatment. Chemotherapy must be started early and with high doses (10 gm in the adult) so as to maintain a high concentration in the blood (greater if possible than 8 mgm per cent). Such dosage [10 gm daily] should be maintained until the condition has become normal unless there is manifest intolerance to the drug. In one case after the administration of 10 gm on the first and second days the patient's temperature rose and the dose was then increased to 16 gm daily up to the seventh day making a total dosage of 110 gm. The fever terminated by lysis becoming normal on the 10th day.

W F Harvey

JAWETZ E & MEYER K F Avirulent Strains of *Pasteurella pestis* *J Infect Dis* 1943 Sept-Oct v 73 No 2 124-43 1 chart & 1 pl [35 ref.]

Controversy regarding the use of killed or live plague vaccine has now continued for a long time and opinion seems to be veering towards the use of the live vaccine. Such a vaccine must of course be safe and must have superiority in immunogenic power. For the routine test of harmlessness performed with isolated plague strains 0.2 ml of a 10^{-4} broth culture dilution (ca. 5 000-10 000 organisms) were inoculated intraperitoneally into groups of mice. This particular dose was selected because it was certain not to produce any primary toxic effects while for the test of immunogenic power dilutions of 300 million per ml suspensions ranging from 10^{-1} to 10^{-4} were inoculated subcutaneously in 0.2 ml amounts into mice and in 0.2 ml or 1.0 ml amounts into guinea-pigs. The standard challenge test dose was administered on the 14th day. Three methods for obtaining avirulent strains were employed: (1) growth of virulent strains for long periods in alcohol broth at high temperature; (2) isolation from virulent strains kept some time in the refrigerator of single avirulent colonies and prolonged incubation of broth cultures at 32°C; (3) passage of virulent strain through immune animals and their recovery by culture from the infected immune animals.

The definition given of an avirulent plague bacillus is that it shall not be able to cause death of the test animal unless introduced in number sufficient to produce toxic death without multiplication. Insistence is made on the necessity for isolation of the avirulent organism which is to be used as vaccine as a single cell. If this is done experience has shown that there is no danger of reversion to virulence. Reference is made to the great differences found among experimental animals in

their resistance to plague toxin and to different avirulent strains. The authors incline to the idea that such differences may only be quantitative and depend on what SCHUETZE [this *Bulletin* 1932 v 29 676 1939 v 36 974] ascribed to the possession of greater or less amounts of envelope. At all events it seems probable that antigenic constituents of importance in immunization may differ in their resistance to heat and that a strain possessing one type of antigen may be immunogenic for one species of animal and another type for another species. The possession of an appreciable amount of envelope might account for the guinea-pig and rat antigens respectively which have been postulated by OTTEN [this *Bulletin* 1937 v 34 416 1942 v 39 309].

It is concluded that properly tested live plague vaccines are safe and superior in immunogenic activity for experimental animals to any killed preparation used at the present time. *W F Harvey*

CHOLERA

SEN GUPTA S K. Prevalent Types of Cholera Vibrio [Correspondence] *Indian Med Ga* 1943 Sept v 78 No 9 464

At the Bower Disease Research Department School of Tropical Medicine Calcutta the following isolations from cases of cholera (diagnosed clinically) were made in the years named —

Year	Cases studied	Vibrio cholerae isolated		No vibrios recovered
		Inaba	Ogawa	
1941	250[? 05]	71	76	58
1942	266	45	70	111
1943	266	nil	154	112

Later I strain was isolated

The Inaba subtype has been declining since 1941 and this fact is important in the preparation of vaccine which for use in the Calcutta area should consist principally of the Ogawa subtype. It is emphasized that in future great care should be taken to type the vibrios during epidemics and to supply the appropriate vaccine.

Charles Wilcocks

GALLUT Jean & GRABAR P. Recherches immunochimiques sur le vibron cholérique. I. Etude quantitative de la réaction de précipitation de l'antigène glucolipidique par l'immunsérum de lapin [Quantitative Precipitation of Cholera glucolipidic Antigen by Immune Serum] *Ann Inst Pasteur* 1943 July-Aug v 69 Nos 7-8 250-53

In a recent publication GALLUT [this *Bulletin* 1943 v 40 910] set out the evidence that the cholera vibrio contains a glucolipidic complex which is the somatic O antigen of this organism and that the toxin itself contains both glucolipidic and protein active elements. In

the present study variable quantities of the glucolipidic antigen were added to a fixed amount of rabbit antiserum and the quantity of antibody precipitated determined by estimation of nitrogen. From the data obtained (1) the ratio mgm of N of the antibody/mgm of glucolipid and (2) the combining molecular weights of glucolipid antigen and antibody were evaluated. The methods thus developed showed that notable differences were apparent in the immunological behaviour of vibrios belonging even to the same serological group and that these might be utilized for the classification of cholera vibrios in general.

B. F. Harley

GAILLET Jean & GRABAR P. Recherches immunochimiques sur le vibron cholérique II Sur les constituants de la toxine cholérique [The Constitution of the Cholera Toxin] *Ann Inst Pasteur* 1943 Sept-Oct v 69 Nos 9-10 307-9 2 figs

Two questions arise for answer (1) Is the toxin made up of several antigens? (2) Does the glucolipidic complex of the toxin differ from the glucolipidic extract of the vibrio?

(1) Since an antitoxic serum exhausted by saturation with glucolipid is no longer precipitated by the toxin it would appear that the toxin possesses no other antigen than the glucolipid.

(2) By comparison of the curves of precipitation obtained with an antiglucolipidic serum tested with (1) the bacterial glucolipid (A) (2) the toxin (C) and (3) the glucolipid of the toxin (B) respectively it is found that the two latter are higher than the first. As the antiglucolipidic serum can only contain antibody to its own injected antigen the deduction is admissible that the differences found are due to an antigenic composition different from the glucolipid of the toxin. The author draws the conclusion from his experiments that when first elaborated the toxin contains a complex glucolipid antigen which subsequently is split into a simpler glucolipid (such as that of the extract of the vibrios) and a substance which is not precipitated by the immune serum. [See also this *Bulletin* 1943 v 40 910.] B. F. Harley

YAWS

KINELL J. Yaws. Report of a Case appearing in a White Man. *U.S. Nat. Med. Bull.* 1944 Jan v 42 No 1 187-92 2 figs

[Yaws probably the commonest of diseases among native children in the tropics is rarely seen in white races or outside the tropics and sub-tropics unless we regard the button scurvy of Ireland the sabbens of Scotland and radesyge of Scandinavia as yaws a question which has never yet been decided or unless we look upon yaws and yphilis as fundamentally the same. To find a case of yaws in a white man a United States soldier in an island of the South Pacific where syphilis is said to be absent is consequently worthy of record.]

The rarity of yaws in Europeans in the tropics is ascribed partly to the wearing of more clothes partly to the higher standards of hygiene in general and partly to the absence of close contact with the native. These facts however would not exclude insect transmission as by *Hippelates pallipes* which is thought to be probable (see this *Bulletin* 1937 v 34 961 963 1936 v 33 961).]

The patient whose case is recorded here was a staff sergeant 20 years of age who had been in the district for fifteen months. He often paid visits to native friends and fondled their children and being an aviation mechanic he was liable to cuts abrasions and scratches on his hands and forearms. His primary lesion mother yaw was on the flexor surface of the right wrist. It appears to have been quite typical [but no mention is made of any preliminary fever or malaise which would probably be present in an adult]. Three months later (i.e. after rather longer than the usual interval) secondaries also typical began to appear elsewhere on the body—root of the penis gluteal furrow finger palm popliteal space cheek chin—together with gland enlargement. Treatment was arranged for a complete course of ten intravenous injections of neoarsphenamine and the same number of bismuth salicylate injections intramuscularly at first at 4 day intervals later at weekly intervals. As usual in jaws healing was in progress after two injections and 21 days after starting treatment the patient was transferred with all his lesions healed. He showed some degree of sensitivity to neoarsphenamine evidenced by a generalized dusky red maculo-papular rash and when he left mapharsen was about to be substituted. He strenuously denied having run any risk of contracting venereal disease moreover syphilis was not seen in the area as already stated.

H Harold Scott

LEPROSY

BARROS DE SÁ M. Estudo analítico da reacção de sedimentação do sangue (em 100 leprosos da Leprosaria de Macasana) [Study of Blood Corpuscle Sedimentation in One Hundred Lepers at the Macasana Leprosarium] *Arquivos da Escola Méd Cirurg de Nova Goa* Ser A 1941 No 15 179-220 [40 refs]

Just twenty years ago PUXEDDU recorded the rapidity of sedimentation of red cells in leprosy particularly in the active stages of the disease [see this *Bulletin* 1924 v 21 874]. He stated that the time varied between 60 and 90 minutes whereas in normal persons it was 7 hours or more. Varying records have been made since that time and the author has done a useful piece of work in making a study of 50 male and 50 female lepers in varying stages of nervous nodular and mixed forms of the disease. He found that the variations between one leper and another were so great that the test was of no real value in diagnosis or prognosis generally but that for each individual patient it might have considerable value in enabling one to judge of progress and of the results of treatment. This means that there is no general rate or formula which will serve as a standard but that each patient should have a curve of sedimentation plotted by frequently repeated tests and useful information could be gathered from such a chart [See also this *Bulletin* 1926 v 23 515 1927 v 24 215 1928 v 25 209 978 979 1929 v 26 341 1039 1930 v 27 338 1931 v 28 960 961 1933 v 30 559 1934 v 31 551].

H Harold Scott

BASOMBRIO G MOM A M NOUSSITOU F & LEON R C Estudios sobre reactividad cutanea experimental en lepra (Comunicación preliminar) [On Skin Reactions in Leprosy] *Rev Argentina de Dermatofisiología* 1943 Sept v 27 No 3 406-11 1 chart English summary

These findings if confirmed will have a considerable bearing on the value and interpretation of the lepromin reaction. The authors have tested the effects of epidermal contact and intradermal injection of 2-4 dinitrochlorobenzene in acetone in cases of tuberculoid leprosy and of leproma and in non leprosy subjects for contact they used dilutions of 1/1000 1/100 1/50 and 1/20 while for the intradermal test the 1/1000 solution was diluted to 1/2000 with physiological saline and 0.2 cc injected. The results were compared with those obtained with whole lepromin prepared by Hayashi's method. A chart shows the reactivity of the skin as erythema or vesication. In the lepromatous patients the reaction is more marked and appears earlier and evolves more rapidly than in cases of tuberculoid leprosy and non leprosy controls but the characters differ little from those in the skin of a subject on a diet in which alkalis and chlorides are a prominent feature. In intensity and time of evolution the effects were the same as those with lepromin. It is inferred therefore that the so-called specific lepromin reaction can be simulated by a non protein non specific irritant or excitant dinitrochlorobenzene. [This is a preliminary communication further work will be awaited with interest.]

H Harold Scott

GONZALEZ GUZMAN I Estudio de los granulocitos sanguíneos de los leprosy [Study of the Granulocytes in Leprosy] *Arch Latino Americanas de Cardiol y Hematol* 1943 May-Aug v 13 Nos 3 & 4 119-38 1 fig [15 refs]

[This article is a useful set off to those which record all sorts of blood changes in leprosy. Unfortunately the number of cases studied here is very small and it would seem that rather a lot is claimed from few data.] The author has studied the numbers of leucocytes—polymorphonuclears eosinophiles and basophiles—and their characters in 33 leprosy nine with the diffuse cutaneous form seven nodular six tuberculoid five of the nervous and five of the Lucio form [see this *Bulletin* 1943 v 40 927] and one mixed. Totals and percentages are given for each. The polymorphonuclear range was between 62.6 per cent in the mixed case and 44.5 in the nervous cases the nodular being 56.8 per cent and the totals well within the normal limits except for one patient with the nodular form who had 12.76 per cmm but another in the same group had only 1.870. A tendency towards leucopenia was thus more common. Leucocytosis rare. The Arneth Index showed a deviation to the left. Eosinophiles also were within the normal limits except in the tuberculoid form where the average was 6.2 per cent the nervous had 3.8 and the other 1-2 per cent. But says the author unfortunately I was not able to find out whether any intestinal parasites or any other condition likely to cause eosinophilia was present in the six patients with this type of leprosy. [This would seem to deprive the observation of any value.] The basophile percentage also did not exceed normal limits though it was highest 0.9 in the diffuse cutaneous and the tuberculoid forms.]

H Harold Scott

Bosq P Eliminacion de los bacilos de Hansen a traves de la epidermis de los enfermos de lepra [Discharge of Bacilli by the Skin in Lepers] *Rev Argentina de Dermatofilologia* 1943 Sept v 27 No 3 423-5 3 figs

The presence of Hansen's bacilli in the deeper parts of the skin is well known but examination of the superficial layers is usually barren of results FOOTE in 1941 found none positive among 63 examined and ABERASTURY found only one among 163 but in that case they were present in large numbers in macrophages and in isolated groups The present author however has recorded finding them at times in large numbers in macrophages and sparsely with the epidermal scales He scrapes gently the upper layers of squamous epithelium without injuring the healthy epidermis and mixes the powdery product with a drop of Meyer's albumin on a slide Before staining he waits for 24 hours because he finds that immediate staining results in incomplete decolorization of the smear and some of the horny scales retain the red of the carbol fuchsin He is of opinion that the stage of epidermic elimination is transient but the cause of the intermittency calls for further investigation On the other hand it may be constant for certain patients and if that is the case there is need for more investigation as to why one should eliminate the bacilli and others do not H Harold Scott

Soro M C Consideraciones clinicas sobre las complicaciones oculares de la lepra [The Eye Complications of Leprosy] *Rev Argentina de Dermatofilologia* 1943 Sept v 27 No 3 412-22 4 figs [37 refs]

The author's remarks are based on a study of 300 cases in the Rosario Hospital He enumerates and comments on the various ocular lesions seen in leprosy as they affect the eyelids and adjacent regions nasal malar temporal and frontal and the conjunctiva the lachrymal glands and ducts the cornea sclerotic and iris Many (perhaps all) are merely local manifestations of the general disease often occurring as complications some years after the cutaneous manifestations appear but sometimes assuming an acute form accompanying or as part of the leprosy reaction The author has not observed lesions of the palpebral conjunctiva attributable to leprosy but a scraping taken at the reflexion of this membrane at the palpebral border may reveal the lepra bacillus He states that the leprosy reaction is a complication which varies according to the clinical form of the disease In tuberculoid cases the effect falls on the integuments (lids) and not on the globe but in lepromatous patients the results may be very serious as regards vision iritis or irido-cyclitis may cause blindness Again the eye lesions may arise and progress quite independently of any general reaction

Two theories have been advanced to account for the involvement of the globe in leprosy The *exogenous* according to which the lesions of the lids the mucosa and the adjacent eye structures arise by continuity and spread from the more superficial to the deeper tissues conjunctiva sclerotic and cornea and then to the iris and ciliary body The *endogenous* or vascular spread based on the facts that often they arise in the febrile period of a leprosy reaction when there is a bacteraemia and that the lesions are usually bilateral There is a third theory that the bacilli pass via the nerves but none of these theories is very convincing H Harold Scott

SOTO M C Algunas consideraciones sobre el tratamiento de las complicaciones oculares de la lepra. [Remarks on the Treatment of the Ocular Complications of Leprosy] *Rev Argentina de Dermatosisifilologia* 1943 Sept \ 27 No 3 429-33 [11 refs]

The treatment of the eye complications of leprosy is divided by the author into (1) Medical (2) Fundamental or aetiological (3) Subsidiary or adjuvant (4) Surgical By the second he means treatment of the leprosy itself by chaulmoogra The proportion of properly treated patients who develop eye complications is to be the subject of another article The third includes protein shock pyretotherapy vitamin etc

He mentions treatment of the lid by carbonic acid snow trichloroacetic acid and emollients of iritis irido-cyclitis and keratitis by atropine diourine yellow oxide of mercury and iontophoresis in particular ionization with a soluble derivative of chaulmoogra Surgical treatment entails dealing with retracting scars ectropion lacophthalmos extirpation of lepromata of the lids and localized episcleral formations The paper is a slight one and in the main that is except for the treatment of the basic disease leprosy the treatment of ocular complications differs in no way from that of the same complications of non leprous origin
H Harold Scott

FIOL H & ZAMBRANO J La vitamina B₁ en el tratamiento de las complicaciones oculares de la lepra. [Vitamin B₁ in the Treatment of Ocular Complications of Leprosy] *Rev Argentina de Dermatosisifilologia* 1943 Sept 27 No 3 439-42 [14 refs]

Others have reported benefit from the use of vitamin B₁ in patients with trigeminal neuralgia in keratitis and corneal ulceration associated with avitaminoses so the authors have tried the same treatment in the eye complication of leprosy with irido-cyclitis (3 cases) with nodular keratitis (2) with these two conditions combined (2) and nodular iritis and conjunctivitis with episcleritis (1 each) They have used hydrochloride of aneurin or thiamin in doses of 25-50 mgm daily or on alternate days in some cases injected intramuscularly or (better) intravenously for a course of 5-10 injections Relapse occurs some months after the treatment is stopped but this clears up on renewal of the treatment Smaller doses given continuously act prophylactically [then why cease treatment and allow relapses to occur?] The authors do not claim that the vitamin treatment is curative but that it diminishes the intensity and duration of the lesions and so delays the onset of loss of vision
H Harold Scott

FIOL H & CALCAGNO O Ensayo e tratamiento de la lepra con un derivado coloidal y timolado del acido chaulmoogrico el timol hidrochaulmoogricosol [Treatment of Leprosy with Thymol hydrochaulmoogricosol a Colloid Derivative of Chaulmoogra] *Rev Argentina de Dermatosisifilologia* 1943 Sept \ 27 No 3 426-8

This preparation is a combination of thymol with the active principles of chaulmoogra and is obtained by treating a colloidal solution of the acid with thymol the final product containing 0.012 gm thymol

and 0.002-0.006 gm of chaulmoogric acid in 2 cc. It may be administered intravenously in doses of 2-6 cc intramuscularly 6 cc or intradermally in doses up to 10 cc each thrice weekly. So far 28 patients with the lepromatous form have been treated of these 10 have improved 18 have remained unaffected none was made worse. Of six with tuberculoid leprosy five have improved the other remaining stationary. Two of the mixed form have been thus treated but so far without change. Some patients had had to cease treatment by the chaulmoogra oil and the ethylic esters owing to ocular complications or leprous reactions but they tolerated the new preparation well. As the authors acknowledge they have used it for four months only far too short a time to judge of permanent results. *H. Harold Scott*

FIG. H. Consideraciones sobre el tratamiento de la lepra y resultados obtenidos despues de un año de observación en el Sanatorio Colonia Buenos Aires [Results of the Treatment of Leprosy during the Year at the Leper Colony "Buenos Aires"] *Rev. Argentina de Dermatosisifilologia* 1943 Sept. v. 27 No 3 434-8

This is a report on the results obtained during the year (presumably 1942) since the colony was opened (dates are not given anywhere). These results are stated in general terms, no figures or details being given beyond the fact that of a total of 369 patients five have been released conditionally, 205 have improved, 93 have remained stationary, 29 are worse and 37 have died.

Chaulmoogra oil has been the drug used, the Heiser Mercado mixture containing chaulmoogra oil 7 olive oil 3 resorcin 0.3 creosote 0.4 camphor 0.15 modified to contain chaulmoogra oil 7 cod liver oil with 5 per cent camphor 3 cc benzyl cinnamate 0.05 gm cholesterol 0.1 gm resorcin 0.3 gm. The ethylic esters were used with 0.5 per cent iodine and 4 per cent creosote in intradermic and hypodermic infiltrations up to 10 or 15 cc at a session. Not all patients can tolerate the high doses but when they can the results are very satisfactory. Intolerance is shown by local pain, lepra reaction, acute eye complications, erysipeloid with fever and these necessitate intermission in treatment. The use of the oil or of the thymol chaulmoogric acid [see above] administered intra- or hypodermically up to 10 cc by multiple puncture has given very encouraging results.

As adjuvants calcium gluconate, shock treatment by protein and autohaemotherapy or milk injection have been given. Diphtheria antitoxin in doses of 1-3 cc every 10-12 days for periods up to a year has been tried in 10 cases without benefit. Leprous reactions are treated by 1 per cent tartar emetic 2 cc daily or by adrenaline 1 per cent [so stated] calcium cholesterol alkalis and a diet of milk, fruit and vegetables. In ocular complications vitamin B₁ intensively by the intramuscular or intravenous route has given encouraging results. The same has been used for painful neuritis. For ulcers of the leg cleanliness, congestion by elastic bandage, the use of infra red rays, infiltration with 1 per cent novocaine, blockage of the sympathetic terminal fibres to maintain capillary dilatation are all mentioned but says the author, the secret of cure of ulcers in many cases is avoidance of excessive manipulation rather than therapeutic applications. Local cautery by carbonic acid snow by trichloroacetic acid or galvanotherapy has given benefit in certain cases and it seems also to affect lesions distant from the site treated. *PALDROCK* [this *Bulletin* 1942]

v 39 462] believes this is due to vaccination from the bacilli destroyed Co-existent disease such as syphilis tuberculosis malaria and cardiac hepatic or renal conditions must receive attention and appropriate treatment
H Haro & Scott

HELMINTHIASIS

BURROWS R Studies on the Intestinal Parasites of Mental Patients
Amer J Hyg 1943 Nov v 38 No 3 293-305 5 figs [21 refs]

The author examined 3 000 stools from 2 055 patients in the South Carolina State Mental Hospital and anal swabs from 1 383 patients A saline purge was given before the stool was collected and every stool was examined on the day on which it was passed Methods included the simple smear iodine stained smears preparations stained with iron haematoxylin when the diagnosis of amoebic infections was doubtful anal swabs (Hall's cellophane swab) for *Enterobius* floatations of soil samples from the exercise yards and examinations of samples taken from walls door knobs toilet seats furniture etc by means of strips of cellulose tape 5 cm long repeatedly pressed over the areas examined and then examined under the microscope

There were 637 newly admitted patients of whom 376 were white people and 261 coloured they came from homes of all grades from wealth to poverty from rural and urban districts from coastal areas mountains and sandy plateaux

The following are the species of parasites found and the total percentage rates found in this group of male and female patients *Entamoeba histolytica* (1.7) *E. coli* (16.3) *E. nana* (12.4) *Entamoeba williamsi* (0.3) *Chilomastix mesnili* (3.3) *Trichomonas hominis* (3.3) *Giardia intestinalis* (1.9) *Ascaris lumbricoides* (1.4) *Necator americanus* (4.5) *Strongyloides stercoralis* (0.8) *Enterobius vermicularis* (0.5) *Trichuris trichiura* (0.8) and *Hymenolepis nana* (0.3)

The proportion of infected persons was much higher among 1 418 patients not newly admitted These included most of the 142 patients previously surveyed by YOUNG & HAM (this Bulletin 1941 v 38 375) who found that 90 per cent of these 142 were infested and that some harboured seven or eight species of parasite Burrows found that both the number of species per patient and the intensity of the worm infestation increased with the length of residence in the institution This increase during residence was shown by egg counts done on 117 women who had been in hospital either one or over five years Of these 87 per cent had very heavy *Trichuris* infestations of over 10 000 eggs per gm (the highest was 181 000) 5 per cent had over 100 000 and 37 per cent had over 50 000

For comparisons of the infestations of males and females and of white and coloured patients the paper itself must be consulted

The relation of defective personal habits of the patients to the rates of infestation was studied these habits no doubt increased the incidence and degree of infestation Attendants dealing with the more deteriorated patients showed higher infestations than those who dealt with other patients A steam hood for the sterilization of small areas of soil in the exercise yards is described and figured G Lapage

BARNETT L Hydatid Disease in New Zealand A Brief Note on Incidence and Prevention during the Year 1942 *New Zealand Med J* 1943 Dec v 42 No 232 260-61

WESLEY C Embolus of Left Femoral Artery due to a Hydatid Cyst *Med J Australia* 1943 Dec 11 v 2 No 24 483

THIAGARAJAH P R The Aetiology of the Anaemia of Ankylostomiasis in association with Malnutrition during Pregnancy Reprinted from *Trans Soc Med Officers of Health of Ceylon* 1942 Dec v 11 14 pp [37 refs]

In Ceylon the high death rates of mothers and children associated with pregnancy and childbirth as well as abortions premature births and associated illnesses are largely due to anaemia caused by hook worm and malarial infections chiefly the former [see WICKARAWASURIYA *Bulletin of Hygiene* 1939 v 14 665] In 1939 haemoglobin estimations were made in 1 119 women admitted to the De Soysa Lying in Home only 150 women had over 50 per cent The anaemia of these women is of the nutritional deficiency type with hypochromia and microcytosis in the author's opinion it is due partly to a deficiency of iron in the diet and partly to defective absorption of iron owing to damage to the intestinal mucosa by the worms [Other workers (e.g. NAPIER *et al* this *Bulletin* 1942 v 39 100 HILL & ANDREWS *ibid* 1943 v 40 324 HEILIG *ibid* 68) think that direct loss of blood with a deficient supply of iron in the food is the main cause of the anaemia of hookworm infection] The author emphasizes the need for iron therapy as a follow up after disinfestation by anthelmintics [In severe anaemia e.g. haemoglobin below 40 per cent some workers insist that iron should be given to increase the haemoglobin before anthelmintics are used and of course continued afterwards] J F Corson

MAKHLINA R M [An Experiment on the Sanitation of a Focus of Ankylostomiasis] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 5 72-6 [In Russian]

The author reports on a village near Batum where the people are engaged in agriculture the sanitary practices are poor and hookworm and *Ascaris* infestation is considerable Treatment with santonin and carbon tetrachloride was given [doses not stated] and between the spring and autumn of 1939 the hookworm infestation rate was reduced from 48.4 to 6.3 per cent [Fulleborn's method] nevertheless 21.4 per cent of those treated remained infested Intensity of infestation was reduced from 4 700 to 410 eggs per gm. of faeces [Stoll method] There was an average increase of 6.2 per cent in the haemoglobin of treated persons

The author concludes that systematic treatment does not give constant results without improvement of sanitation G Lapač

BEATTIE J HERBERT P H WECHTEL C & STEELE C W Studies on Hepatic Dysfunction I Carbon Tetrachloride Poisoning treated with Casein Digest and Methionine *Brit Med J* 1944 Feb 12 209-11 [12 refs] [Summary appears also in *Bulletin of Hygiene*]

A case of acute carbon tetrachloride poisoning following accidental ingestion of 30-40 cc. was successfully treated with methionine The

patient a U S Army Air Force sergeant pilot aged 23 swallowed the carbon tetrachloride at 4 15 p m on Oct 2 1942 on an empty stomach having had no food since 7 15 a m He quickly became dizzy and light headed but could walk with assistance At 4 35 p m he was given salt and water and this caused vomiting at 5 p m He was put to bed and was given 1½ grains of luminal he refused food that evening and next morning He was examined at 11 a m on Oct 3rd by one of the authors who found the liver tender and enlarged to 2 in below the costal margin At 12 30 p m the patient was given by mouth and retained 2 gm of dl methionine at 3 30 p m 1 cc of a casein digest methionine solution was slowly injected intravenously and caused no immediate reaction five minutes later 5 cc was injected also without reaction

The infusion was prepared by dissolving 20 g of a dried papain trypsin digest of casein in 600 ml of distilled water The solution was acidified and to it was added 15 g of dl methionine It was then boiled and filtered The final pH was 7.6 and the solution was approximately isotonic It was tested by injecting 20 ml into the ear vein of a rabbit No effect was observed within a period of two hours

Continuous intravenous infusion of the solution by a drip apparatus was begun immediately the rate being about 2 cc a minute At 6 p m the edge of the liver was 2½-3 in below the costal margin At 6 30 p m when 436 cc had been infused he complained of chilliness intense headache and backache his pulse was thin his lips slightly cyanotic and his blood pressure was 130/20 infusion was stopped hot water bottles and blankets applied and 5 grains of an aspirin codeine mixture given An hour later he was much better and his blood pressure was 120/88 At 7 p m he ate and retained a small meal

Next morning Oct 4 he was mentally alert and took food well the edge of the liver was only ½ in below the costal margin On the following morning however the dizziness and headache returned and his liver was 1 in below the costal margin methionine was given by mouth 2 gm at 9 a m and 2 gm at 7 p m He took food well and felt better and by next day Oct 6th he was apparently well but was kept under observation for another week soon afterwards he had resumed normal operational flights over enemy occupied country

Icterus was absent throughout the illness The total amount of methionine given intravenously was 9.5 gm

Rationale of methionine treatment as based on the observation of MILLER and WHIPPLE in 1942 (*J Exper Med* 1942, 76:471) that damage to the liver of animals from chloroform anaesthesia could be avoided if 3 gm of methionine were injected within 3-4 hours

Laboratory investigations indicating the mode of action of methionine and partition of the urinary sulphur between oxidized (total sulphate) and unoxidized (neutral) fractions

The nitrogen balance showed a retention of 6 gm over the whole period but a negative balance of 7 gm on the second and third day suggesting that on these days the processes of protein synthesis in the liver were impaired There was a significant retention of sulphur and an excessive excretion of the unoxidized fraction during the first two days and during the relapse—65 per cent of the amount given as methionine—whereas in the normal individual 95 per cent is excreted as the oxidized fraction within 24 hours The only other significant

abnormality was a rise in serum bilirubin when the liver was enlarging rapidly and the transient appearance of urobilinogen during the relapse

It is concluded therefore that no actual destruction of liver tissue took place but that the cause of liver disturbance induced by carbon tetrachloride is the abnormal metabolism of methionine and related compounds. The administration of methionine is considered to have prevented permanent liver damage

Ethel Browning

LEVIN I L [The Problem of Strongyloidosis] *Klinicheskaya Meditsina* Moscow 1942 v 20 No 5-6 70-74 [In Russian]

This paper gives a general account of strongyloidosis due to infestation with *Strongyloides stercoralis* and an account of 12 cases seen by the author (cf SHIKHOBALOVA & SEMENOVA below). Some details of three cases are given.

The author points out that strongyloidosis is not a disease of tropical climates only—he regards it as a definite disease characterized by gastro intestinal symptoms and general intoxication.

The clinical picture is extraordinarily varied. Some cases show few or no signs of illness; others are severe and fatal. The onset may be acute simulating enterocolitis or gradual with debility, headache and gastro intestinal troubles persisting for several years with alternating improvement and deterioration. Among gastro intestinal symptoms are vomiting, heart burn, nausea, meteorism, salivation, giddiness, diarrhoea or alternating diarrhoea and constipation and jaundice in some cases. Some patients may undergo operation for appendicitis, gastric ulcer, etc. this had happened in three of the author's cases. Meteorism was the most frequent complaint. He noted also a rise in the temperature sometimes to high levels. A temperature of 38-39 C [100.4-102.2 F] may be maintained for several days or there may be periods of subnormal temperature with intervals of higher temperature. No other cause for the high temperature could be found. The patient may have a characteristic muddy tint of the skin of the face. A rash may occur on the skin and may be localized over the abdomen. The blood may show signs of anaemia and eosinophilia of varying degrees. Treatment was not satisfactory. Carbon tetrachloride, male fern and thymol were tried; thymol was the best of these. After it patients reported improvement but it did not remove the larvae completely from the faeces although it reduced their number. Reference is made to treatment with gentian violet which apparently the author did not use (cf SHIKHOBALOVA & SEMENOVA below).

G Lapage

SHIKHOBALOVA N P & SEMENOVA N E [On the Problem of the Clinical Study and Treatment of Strongyloidosis] *Med. Parasit. & Parasitic Dis.* Moscow 1942 v 11 No 5 76-83 [In Russian]

After a brief history of the discovery that some cases of helminthiasis in man are due to *Strongyloides stercoralis*, the authors note that the first cases in Russia were discovered in 1896 by SPASOKUKOTSKY. In 1922 SKRIABIN and WAGNER collected four cases and themselves described five others. By 1924 Russian cases had been noted in Erivan, Azerbaijan, the Don Basin and Middle Asia and by 1937

toxic effect of products liberated when the nematodes die in the intestine and they quote much experimental work [abstracted in this *Bulletin*] which indicates that the injection of *Ascaris* material can cause the symptoms of acute and chronic ascariasis.

The symptoms are very varied. Chronic ascariasis is described and its treatment with *santonin* or oil of *chenopodium* discussed.

The greater part of the paper deals with acute ascariasis. The authors very strongly deprecate the use of an anthelmintic during the acute stage when treatment should be symptomatic. Most of the older children had a history of chronic ascariasis. Of cases with out other diseases 27 per cent died. In 29 of the 162 cases (18 per cent) the acute symptoms had followed anthelmintic treatment in others no exciting cause was found. Five clinical types are described. *Acute inflammation of the alimentary tract* occurred in 86 cases with 27 deaths. The onset was acute with very severe vomiting first of food and then of clear fluid and possibly worms (vomited by 58 patients) diarrhoea also occurred (34 cases) and dehydration collapse followed a rise of temperature and sometimes tetany followed (in two cases). In these cases the disease resembled acute infectious diarrhoea and the patients either died or recovered rapidly after two days. Blood and mucus in the stools may suggest dysentery. For the dehydration and severe circulatory depression a 5 per cent glucose saline was given parenterally. Vomiting was controlled by stomach lavage and adrenalin in 10 in a teaspoonful of ice water every hour for four or five doses. Calcium gluconate was given parenterally for tetany.

The toxic and cerebral type of the disease occurred in 15 cases. In eight it followed the use of an anthelmintic but was not due to the drug or to cerebral malaria. There were eight deaths and three others probably died at home. The onset is usually sudden and the dominating symptom is extreme restlessness. There are three rapid rise of temperature deep and rapid respirations occur and in a few hours there may be delirium, convulsions and semi-consciousness. Death may occur or recovery in 2-3 days. Encephalitis or meningitis may be simulated. The treatment of this type was symptomatic and was not satisfactory.

A third type of case shows acute abdominal symptoms. The authors had 34 cases of this kind with five deaths. Worms were palpable in 23 the condition followed the use of an anthelmintic in four only. The commonest signs are those of partial intestinal obstruction. An anthelmintic may expel some of the worms but more often it causes the partial obstruction to become complete. Other cases simulate acute appendicitis they may subside spontaneously or peritonitis or intussusception may develop. In such cases the intestine contracts on the worms and in this connexion the authors refer to the work of Rost [this *Bulletin* 1931 v. 17, 80] holding that whole extracts of total *Ascaris* increase the tonus of the intestinal wall while extracts of its cuticle relax it. The authors were able to remove many of the worms by giving belladonna, atropine or hyoscamine in full doses every 2 hours to relax the intestinal wall and liquid paraffin to lubricate the intestinal contents. Opium or morphia may be given to relieve the pain. Olive oil enemata help to remove worms from the lower bowel. After this treatment has expelled worms an anthelmintic may and expel more. Obstructive symptoms were thus relieved in 23 of the 34 patients.

The respiratory type was seen in 12 cases there were no deaths It is due to larval infiltration of the lungs The onset is rapid with cough dyspnoea and rise of temperature recovery usually follows in 4-5 days Larvae were never found in the sputum and may not be found unless the infestation is massive Treatment included diaphoretics expectorants and oxygen In 14 cases these types were mixed and 10 of these patients died Complications due to the migration of the Ascarids occurred in only one case in which an Ascaris in the trachea of a child of 4 caused fatal asphyxia The hospital records during 1938-1941 showed four other cases the worms being found in the common bile duct the pleural and peritoneal cavities and under the capsule of and in the liver

In all cases the diagnosis was confirmed by finding Ascaris in the alimentary canal The authors state that no satisfactory cutaneous test is available for general use and that X ray examination may be useful but is hardly necessary

Discussing their results the authors refer to work on the haemolysis of mammalian red blood cells by extracts of Ascaris on the production of urticaria asthma etc by the injection of Ascaris extracts and on the antitryptic action of Ascarid extracts They quote records of severe intoxication or involvement of the nervous system in ascariasis which are they think striking features of the disease in children They occurred in 17 per cent of their cases and were responsible for 38.3 per cent of the deaths among these They discuss experimental work which suggests that in this type of case Ascaris toxins cause degeneration of the liver and suprarenal gland so that failure of these glands may be a factor Anaphylactic shock and allergy in ascariasis are also discussed

G Lapage

HAMANN C B Estimation of Histamine in the Blood and other Tissues of Rats and Guinea Pigs infected with *Trichinella spiralis* *J Parasitology* 1943 Dec v 29 No 6 367-72 2 figs [14 refs]

Little is known about the toxicology of trichiniasis One product of tissue destruction is believed to be histamine Because acute symptoms of trichiniasis appear at the height of tissue invasion and presumably of tissue destruction by *Trichinella* the author undertook a study of the histamine content of the blood and some other tissues (lung intestine kidney skeletal muscle liver) of albino rats and guinea pigs experimentally infested with *Trichinella* He concludes that there is an increase of histamine in the blood and possibly in some other tissues but that the results are difficult to evaluate because of the variability of both the experimental animals and the controls also we know little about the significance of slight changes in the histamine content of blood and the tissues nor do we know how quickly histamine may be excreted or destroyed

FLURY (1913 *Arch exp Path u Pharm* v 73 164) suggested that toxic effects of *Trichinella* are due not to a single substance but to a group of purine bases and creatine derivatives such as methyl guanidine HARWOOD P D SPINDLER L A CROSS S X and CUTLER J (1937 *Amer J Hyg* v 25 362) noted an increase of guanidine in rabbits experimentally infested with *Trichinella* but SOLLMAN T (1942 *Manual of Pharmacology* Saunders Philadelphia) doubted the significance of methyl guanidine

[May 1944]

the children were deficient in musculature and sub-skin tissue and it is thought that this was due to chronic food lack. A few complained of tenderness of the muscles of the extremities which may or may not have been due to scurvy. The posture of 33 per cent of them was considered to be satisfactory. 11 per cent had knock knee but only 0.3 per cent showed enlarged wrists and there were 10 cases of beading of the ribs. Skin lesions due to dietary deficiency appeared to be erythema—36 per cent of the children were suffering from phrynodema common—43 per cent of them from Mosaic but the co-existence of syphilis was thought to be a complicating factor. Out of 496 Wassermann tests taken at one school 64 (12.9 per cent) were positive. Eyes ears nose lips and mouth were also examined. Only 0.6 per cent were suffering from Bitot's spots thought to be due to a vitamin A deficiency. 15.4 per cent showed signs of cheilosis and 2.8 per cent angular stomatitis both considered to be caused by a deficiency of riboflavin. 31 per cent had slight dental caries and 11.7 per cent severe caries. 12.8 per cent had spontaneous bleeding gums but it is suggested that this may have been due to faulty dental hygiene or secondary syphilis and not necessarily to scurvy.

There was a very high incidence of enlarged glands. 73.4 per cent had enlarged glands of the neck. Slightly enlarged thyroids were found in 1.8 per cent of the children. Chests lung hearts and abdomens were also examined. The final classification of the children was made into three groups. In 39.6 per cent of them no abnormality was detected. 30.6 per cent required nursing or medical supervision and 9.8 per cent were obviously ill and required hospitalization. It is recommended that all children in the township shall receive periodical medical examination that a part time dentist and a school nurse are required and that school feeding should be instituted forthwith.

HARK S. L. Adult and Infant Pellagra in South African Bantu A
Comparative Clinical Study South African J Med Sci 1943
July 8 No 2-3 106-114 45 ref

In this Bulletin 1938 33 729 815 880, all the records relating to pellagra were summarized to that date including infantile pellagra. The author gives a list of these records and most usefully brings the series up to July 1943.

He then considers 96 cases coming under his own observation 69 of the disease in adults 34 in infants and young children. Fifty three cases were seen in Johannesburg 43 in rural areas of Pekaia and Impendle Natal.

All those who have been interested in the disease as seen in young children in Africa will read this article with advantage.

To Dr Hark was given the opportunity of studying the disease in the adult and in the infant side by side an opportunity denied to those who first wrote concerning the infantile type in East and West Africa and failed to recognize the pellagrous nature of the affection. In discussing his cases the author points out the likeness of all essential symptoms in the two age groups and differences being due to the acuteness of the disease in infants.

[His findings confirm therefore the view always held by the reviewer.]
H. S. Stannus

1. HUA T J & CHE G S Y Preliminary Report of Pellagra Outbreak in Kowloon *Caduceus* Hong Kong 1941 Feb v 20 No 1 1-12 2 graphs & 15 figs on 10 pls
11. WILKINSON P B & AU KING Retrobulbar Neuritis due to an Avitaminosis *Ibid* 13-21 3 folding pls

Pellagra was considered a comparatively uncommon disease before the war. Now however the affection is becoming a matter of some importance among the refugee population.

1. In the last three quarters of 1940 185 males mostly between 30 and 50 years of age and 235 females between 40 and 50 came under observation of whom 137 died (32.6 per cent).

The authors classify their cases as (1) those with dermatitis (2) those with dermatitis and diarrhoea (3) those with dermatitis diarrhoea and marked prostration (4) those with marked mental symptoms.

The symptoms in great part common to all were—burning tingling and numbness of the skin typical dermatitis chiefly on exposed surfaces and pressure points with bullous formations in many blepharitis stomatitis angular stomatitis glossitis dysphagia. Meningism was present in some and what the authors refer to as beriberi symptoms in 56 per cent. The eyes were not examined.

[In one place the authors say while deficiency of vitamin B₃ as a cause of pellagra may be considered proved. This is not very clear but presumably the reference is to nicotinic acid.]

11. In six months the authors have met 15 cases of a condition diagnosed as retrobulbar neuritis among refugees believed to be suffering from pellagra with symptoms described as sore tongue giddiness palpitation acroparaesthesiae weakness in the limbs etc. in one oedema of eyelids noted in one scrotal eczema in two perleche (*sic*) in one the canthi were affected one had a pellagrous rash.

In 11 of the 15 cases (11 males and 4 females) the fundus was normal 4 showed some degree of optic atrophy with temporal pallor of the discs one complained of photophobia but only on being asked all except two exhibited a sluggish pupillary reaction to light and poor maintenance of contraction. Examination of the fields showed concentric or quadrant contraction in all except two but the authors were unable to demonstrate central or paracentral scotoma for white red or green.

Patients were stated to have no neurological symptoms.

Regarding treatment—nicotinic acid 100 mgm per day for one week is said to have caused much improvement in visual acuity. One drachm of yeast thrice daily brought about cure. To a single patient 1 mgm riboflavin thrice daily was given vision was restored from 6/36 to 6/6 in each eye in 10 days. To a second patient given 3 mgm riboflavin daily for 2 weeks without improvement thiamin (Betaxin) 3 mgm by injection was added but without effect during the fourth week 50 mgm nicotinic acid twice daily were administered with improvement.

[These cases obviously belong as the authors suggest to the group now probably well known to which also belonged those described by Fitzgerald Moore (this *Bulletin* 1934 v 31 820 1938 v 35 72) and LANDOR and PALLISTER (see *Bulletin of Hygiene* 1935 v 10 733). They all respond to yeast but unfortunately no one has yet

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carried out controlled experimental treatment in such a way and upon such numbers as to be of value in suggesting the true aetiology]
H S Stannus

HAEMATOLOGY

MERA B Preliminares del estudio de la mimosocitemia en Colombia
[Preliminary Study of Sickle Cell Anaemia in Colombia] Bol
Oficina Sanitaria Panamericana 1943 Aug v 22 No 8 680-82
English summary

Sickle Cell Anaemia is a blood disease found in negroes or descendants of negroes. There are two forms latent sickle cell disease or sickle cell trait in which there is only cell deformation and active sickle cell anaemia with active clinical manifestations. Puerto Tejada a Colombian town with an 80 per cent negro population was chosen for an experiment. All school children between the ages of 7 and 17 were studied as to the presence of sickle cell disease. Of the 489 negro children examined 46 or 9.4 per cent proved positive. Of them 5.45 per cent suffered from sickle cell trait and 3.95 per cent from sickle cell anaemia. Symptoms in the second group included anaemia, jaundice, permanent weakness, abdominal colics, leg ulcers, etc. In many cases the disease is hereditary and its presence explains many pathological conditions of the negro race in Colombia. More complete research is expected to be carried out in the very near future.

DERMATOLOGY AND FUNGUS DISEASES

MOORE M & MANTING G Sporotrichosis following a Mosquito Bite
Description of Lesions in a Girl of Indian and French Descent
Arch Dermat & Syph 1943 Nov v 48 No 5 525-6 1 fig

When Indian and white blood is mixed the apparent immunity shown by Indians to certain cutaneous diseases commonly found in the white race is lost and it is noteworthy that sporotrichosis has never been reported in the full blooded American Indian. In the case here described only three eighths of the blood is French. Since the organism may grow saprophytically in the soil and has been found on many plants it is not unlikely that the mosquito can occasionally act as vector as it seems to have done in this case. The girl now aged 9 years was born in Missouri and had never been out of the State. She was bitten on the left wrist by a mosquito some five months before she attended hospital. The affected area became a papule and then a nodule which later softened and broke down to form an ulcer. Other nodules then developed along the anterior aspect of the forearm in turn rupturing to form persistent ulcers with indurated and raised edges. The borders were undermined and violaceous whilst the centres showed bright red verrucous granulation tissue. Microscopically the organism was identified as *S. schenckii*. Saturated solution of potassium

iodide was given three times a day the starting dose being 10 drops. After the fourth day each dose was increased daily by 1 drop. An ointment containing 4 per cent bismuth tribromphenate was used locally. There was great improvement after months.

Sydney Thomson

BALINA P L BOSQ P BARNATÁN M & HERRERA J A Un caso de blastomicosis ulcerosa. Beneficio de la sulfamidoterapia [A Case of Ulcerating Blastomycosis. Improvement with Sulphonamide Treatment] *Rev Argentina de Dermatosisifilologia* 1943 Sept v 27 No 3 451-3 2 figs

An Englishman 48 years of age an estate manager in the Argentine in December 1939 had several teeth in the lower jaw extracted for pyorrhoea. An erosion obstinate to treatment persisted in the gum but cleared up after 20 sessions of radiotherapy. In November 1940 a small reddish nodule appeared on the right nostril no biopsy was made but X ray therapy was again given (94 sittings) and radium applications twice. The lesion nevertheless ulcerated and extended to destroy both nostrils and was spreading to the cheeks especially the left. He then came under the authors care. The diagnosis rested between blastomycosis and leishmaniasis. biopsy showed it to be the former. Sulphathiazole locally and *per os* was started 4 gm daily and improvement was observable in a week. The lesion ceased to spread and repair started. He had had at the time of reporting 165 gm the lesions on the cheeks had cicatrized and the nostrils were healing. Much time had been lost and disfigurement resulted from failure of correct diagnosis.

H Harold Scott

ALBERT M A Note on a Case of Blastomycosis cured by Sulphapyridine and Sulphathiazole *Brit J Dermat & Syph* 1943 Dec v 55 No 12 294-6 1 fig

BALINA P L HERRERA J A BOSQ P & NEGRONI P Tercer caso argentino de histoplasmosis. Beneficio de la sulfamidoterapia [The Third Case of Histoplasmosis recorded in Argentina Sulphonamide Therapy] *Rev Argentina de Dermatosisifilologia* 1943 Sept v 27 No 3 453-4 2 figs

An Argentinian of 49 years in municipal employ in December 1941 had what he thought was an ordinary pimple of the left nostril. As time went on instead of healing it ulcerated and extended over the left nostril and the nasal septum with infiltration and oedema and copious mucopurulent secretion and was intensely painful. It was thought to be mycotic and a biopsy showed it to be histoplasmosis. Treatment by sulphonamides was begun and in nine months he had had 96 gm of sulphamylamide and 220 gm of sulphathiazole. The latter was applied locally also. Improvement was soon observable and now the lesion has largely cicatrized. Progress would probably have been more rapid had the patient not had to interrupt the course of treatment. Photographs show well the condition before and after treatment [See also NEGRONI this *Bulletin* 1941 v 38 534]

H Harold Scott

MISCELLANEOUS

**KHARTOUM The Kitchener School of Medicine Seventh Report 1939
1942. 88 pp. 4 pls.**

Since 1924 the School has admitted 138 students and has passed out 82 graduates who are licensed to practice medicine in the Sudan. Normally, after a medical course lasting six years, successful candidates having passed the final examination are required to spend two years as residents in certain hospitals. At the end of this period, if reports show them to be fit to carry on medical duties without supervision, they are accepted to the rank of Sudanese Medical Officer of the Sudan Medical Service. Post graduate classes are organized locally, but graduates selected to fill senior posts are sent to London for post graduate study.

In the reports here presented for the years 1939-42 a very comprehensive account is given of the syllabus and of the activities of the students. It is evident that much thought has been given to the question of what is to be taught and that the training is very comprehensive. It is therefore important to know to what extent that training succeeded in producing efficient doctors and on this point the comments of visiting examiners are illuminating. [It should be understood that all examinations are conducted by external examiners and that the final examinations are under the supervision of a Visitor appointed by the Royal Colleges of Physicians and Surgeons.] For 1939 the Visitor was Sir Adolphe ABRAHAM and his report is almost entirely favourable. For 1940 permission had been obtained from the Royal Colleges to proceed without a Visitor but the services of Lt-Col F N FOSTER and Lt-Col E G OASTLER were secured; their brief report also was very favourable. For 1941 Col J S K BOYD and Col A E RICHMOND presented reports which expressed opinion of the candidates much less favourable than those of the previous years. For 1942 the Visitor Maj-Gen W H OGILVIE made the satisfactory comment that the clinical part of the final examination was better done than the papers, an opinion directly contrary to those of his predecessors.

Comments were made on accommodation, organization and teaching material. It is evident that the shortage of post mortem work, which is difficult because of the religious customs of the people, is a serious handicap.

The chief criticism of the students was that they appeared to have learned their subject rather from books and lectures than from their own observations and investigations and that they were less at ease when confronted by a patient than when asked a question which could be answered from recollection of what had been taught. [Maj-Gen Ogilvie did not subscribe to this opinion. Col Richmond remarked, however, that his criticism related to the students he examined and that they were probably not so highly intelligent as men from previous classes whom he had met at work in the Sudan.]

[It would be surprising if these students did not show some tendency towards undue respect for the written word or the authority of teachers. The Moslem way of life inculcates something of that frame of mind and the respect paid by literate Mohammedans to the Koran must be instilled into children from an early age. To change from unquestioning acceptance to an attitude of critical evaluation depends not only upon the teaching given at a medical school but also upon the

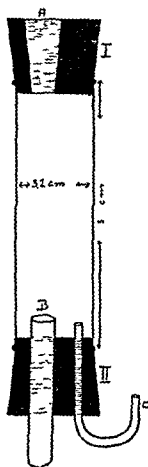
attitude of the teachers in the primary schools and perhaps most important upon the atmosphere of the home in which infancy and early childhood are spent. It may well be that one or more generations will be needed before an undergraduate in the Sudan enters upon his medical course in a critical frame of mind.]

There seems to be little doubt that the spirit of the school is happy and that the teachers and the Dean are enthusiasts but emphasis is laid in the reports on the need to improve the pre medical education in all branches of general culture. [The report is a heartening indication that the Government is training Africans to take responsibility for the welfare of their own people.]

Charles Wilcocks

PLUM C M A Method for collecting Large Samples of Blood from Living Rats *Acta Physiol Scandinavica* 1943 v 6 No 4 289-90
1 fig

With the simple apparatus shown in the figure 1 or 2 cc of blood may be taken from the tail of a rat and this repeated at short intervals. The hole (A) in the rubber stopper has a diameter of 1.6 cm at the outer



Apparatus for taking blood samples from tail of living rat
[Reproduced from *Acta Physiologica Scandinavica*]

end and 1 cm at the inner end. The test tube (B) is 1 cm in diameter the tube (C) is connected to a vacuum pump.

eosinophilic lung by others [though Weingarten distinguishes the first named from the others mainly by the fact that the clinical and radiological signs in Loeffler's syndrome disappear rapidly and spontaneously whereas tropical eosinophilia may persist for a long time unless appropriate treatment by arsenicals such as neosalvarsan is undertaken].

The patient in question had suffered from asthmatic attacks in 1936-37 and then went to India where he worked for 4½ years in excellent health except for attacks of diarrhoea. In 1942 he was passed fit for a Commission in the Naval Reserve. Four months later he had a return of his attacks of asthma. This time accompanied by increasing fatigue and loss of weight. For nearly two months he had fever and at the end of February 1943 he was operated upon for hepatic abscess. About three weeks later the leucocytosis which had fallen after his operation increased to reach 37 500 per cmm 78 per cent of which were eosinophiles but there was no fever. Asthmatic attacks with moist rales and rhonchi continued and by X rays a diffuse faint mottling was seen. Treatment on the usual lines for asthma brought very little relief until the suggestion was made that the case might be one of tropical eosinophilia. Carbarson 0.25 gm twice daily was given for ten days and a second course after an interval of ten days. By that time the leucocyte count was normal and the eosinophile percentage was 9. The cough disappeared and the physical signs in the chest cleared up.

[This peculiar condition has repeatedly been referred to in this Bulletin the leucocytosis may reach higher values than that of the case here reported 60 000 or more and eosinophiles 87 per cent. It is known also that relapses may occur after intervals of three years and even longer and if the condition is found to occur in places other than India (in Bon Bay especially) the state recorded in 1942 in this patient may have been the same as that in 1936-37. There is much yet to be learned concerning the so-called Tropical Eosinophilia. See this Bulletin 1941 38 535-539 1943 v 40 720, 71 948.]

H. Harold Scott

CHAKRAVARTY U. N. & ROY S. C. A Case of Tropical Eosinophilia
Indian Med Gaz 1943 D c 78 No 1 596-7

SHAH R. L. A Case of Pseudo Tuberculosis of the Lungs with Eosinophilia
Indian Med Gaz 1943 D v 78 No 1 597

STEIN H. B. & MILLER E. Onyala and Acute Thrombocytopenic
Purpura Clin Proc Cape Town 1943 Oct v 2 No 10
347-54

In this informative paper the authors review the similarities and hence the possible relationship between onyala and thrombocytopenic purpura. In an instructive table they set out the similarities and differences. The similarities are many and the differences few, namely the geographical limitation of the former to Africa, the age and sex incidence (onyala affecting mostly adult males, the latter children and young adults and females more than males) and lastly the fact that the former is usually an acute condition, the latter chronic but no hard and fast distinction is possible as regards the last. Clinically haemorrhagic bullae are a characteristic feature of onyala but they have not been described in thrombocytopenic purpura.

The authors then record in detail the case of a European woman of 39 years exhibiting purpura associated with nephrosis she had also had deep X ray therapy but whether this played a part in producing the purpura is not known Four months later she had haemorrhage from the nose and mouth and there were two haemorrhagic bullae on the right cheek and three smaller ones on the tongue with purpuric spots on legs and arms This sequence and the coexistence of purpura and bullae on the second admission to hospital are strong evidence that there is a close connexion between the two diseases they may even not be two but onyala may be an aggravated form of acute idiopathic purpura [See also GILBERT below] *H Harold Scott*

GILBERT B Onyala a Tropical Condition characterized by Haemorrhages Its Gynaecological Aspects *J Obstet & Gynaecol Brit Empire* 1943 Dec 1 50 No 6 437-9

The author gives a good description of the main features of onyala and mentions that it belongs to the purpura group and is in essential an acute thrombocytopenia He states that its existence outside Africa is very doubtful though he acknowledges in his summary that it possibly occurs in Central and South America Cases recorded as thrombocytopenic purpura with symptoms resembling those of onyala have been reported in New Orleans In text books bleeding from the genital tract is not mentioned and when it occurs it is liable to be mistaken for menorrhagia The author records a case occurring in late pregnancy in a multipara the disease did not interfere with or complicate labour [See this *Bulletin* 1938 v 35 74 444 (in the last case with vaginal bleeding is mentioned) 1939 v 36 157 158 938 1940 v 37 675] *H Harold Scott*

GRACE A W Tropical Lymphangitis and Abscesses *J Amer Med Ass* 1943 Oct 23 123 No 8 462-6 1 chart

In 1926-28 Dr Grace was engaged on a special mission of investigation in British Guiana into filariasis lymphangitis and abscess formation The results of this were published in a Memoir of the London School of Hygiene and Tropical Medicine [reviewed in this *Bulletin* 1932 v 29 73] The present article is based on and arises out of the author's previous studies By tropical lymphangitis he implies cases in which no local lesion or other apparent cause can be found to account for the lymphangitis It usually comes on suddenly and in 80 per cent of cases affects the lower limb the arm breast and scrotum in this order accounting for the remainder The age group most attacked are those in the second decade and four fifths are below 30 years of age The symptoms are usually severe deep seated pain at first localized later spreading followed by an extending erythema with streaks to the adjacent glands and oedema with fever to 103 F and considerable prostration temperature begins to fall in 24 hours though severe attacks persist for longer and the symptoms abate and pass off in 2-3 days there is no desquamation There may rarely be only one attack but more often there are recurrences and the remissions range between wide limits from days to years Hard tender nodules 2 by 2 by 0.5 cm may be felt in the deeper tissues most of these subside but some progress to abscess formation and from this beta haemolytic streptococcus may be obtained usually in pure culture

author feels that the present list will be useful as a summary of what is known and which may be required by medical entomologists and others now working in this part of the world

The list is drawn up in a comprehensive way and includes many bloodsucking insects which are not known to attack man or common domestic animals. It includes ticks and parasitic mites as well as insects which suck blood or cause myiasis. The author has concluded that it is not for him to make a list of the mosquitoes of the area a decision which may be wise but which will certainly be regretted by those who use his paper. A full list of references is included

P A Buxton

PEMBERTON C E Entomology Rep Comm Exper Station Hawaiian
Su Pl Ass 1941-42 1943 18-22 [Summary taken from Rev
Applied Entom Ser B 1943 Dec v 31 Pt 12 247]

Aircraft quarantine work was continued in Hawaii during 1941-42 in co-operation with the military and naval authorities but was discontinued at Midway and Canton Islands in December 1941. The aircraft are sprayed before they are inspected and most of the insects found were dead but they included some serious pests and one live mosquito of the genus *Anopheles* in an aeroplane from California. R H Van Zwalenburg found that the application of copper sulphate at 1½ oz per 50 cu ft water inhibited mosquito development for at least 2½ months in water stored for fire protection and in co-operation with T N Humura that Vatsol (a sulphonated ester of boric acid) or 2.7 R (a sulphonated naphthalene) applied at the rate of 2 cc of a 5 per cent solution per 1000 cu ft water did so for about six weeks and several months respectively. He also found that *Baeus californicus* Pierce the egg parasite introduced from California for the control of *Latrodectus mactans* F was established on Maui in November 1941 over a year after it had been liberated there.

SUTTON R L Jr Trombidiosis (Chigger Bites) Relief of Itching
with Ethyl Aminobenzoate in Flexible Collodion J Amer Med
Ass 1942 Sept 5 v 120 No 1 26-7

The author recommends the following local application to relieve the itching caused by chigger bites: ethyl aminobenzoate 2 gm or cc flexible collodion 15 gm or cc. This relieves itching for 4 to 8 hours. [The author applies the term chigger to the harvest mite this should not be confused with the flea *Tunga penetrans* to which the name chigger or jigger is applied in Africa.] J F Corson

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THE GEOGRAPHICAL DISTRIBUTION OF MITE BORNE TYPHUS FEVER

[TSUTSUGAMUSHI DISEASE JAPANESE RIVER FEVER SCRUB TYPHUS
MITE FEVER]

By J F CORSON O B E M D D P H D T M & H

Acting Assistant Director Bureau of Hygiene and Tropical Diseases
and

Charles WILCOCKS M D M R C P D T M & H

Acting Director Bureau of Hygiene and Tropical Diseases

[The name mite borne typhus is applied in this study to the rickettsial disease which has been known by the names quoted in the heading of this paper and other names. The researches of LEWTHWAITE and SAVOOR (1940) indicate that there are no essential differences between the diseases to which these names have been applied and that finding has been accepted by the Bureau of Hygiene and Tropical Diseases. MEGAW'S view (ROGERS & MEGAW *Tropical Medicine* 1942 p 176) that this disease should be included in the typhus group on grounds of aetiology is also accepted. It seems unnecessary to create a division in the rickettsial diseases when the aetiological agents are so much alike and the modes of transmission so similar.]

Mite borne typhus fever is known to occur in the following countries Japan Formosa and the Pescadores Islands Borneo New Guinea Queensland Java Sumatra Malaya French Indo China Burma India and Ceylon. Various authors have stated that it occurs (or probably occurs) in Korea Shanghai and other places in China and in the Philippine Islands but the opinions appear to have little evidence to support them.

As the name tropical typhus has been used to include both murine typhus and mite borne typhus the diagnosis is doubtful where agglutination tests have not been made.

With regard to arthropod vectors the fact that they have been found on an animal does not necessarily mean that they are ectoparasites of that animal their presence might be accidental and temporary.

The following localities are mentioned by Jura HATORI (1919) —

- (a) Karenko district
 - (1) Mokkui and Rokei valley
 - (2) Yoshimo plantation
 - (3) Kotobukimura and western Tsyoda plantation
 - (4) Hayashida plantation Horin Sho and neighbouring forests
 - (5) Maribashi plantation
 - (6) Seisu valley
 - (7) Shinjo and Takkiri valley
- (b) Girin district
Dainanwo river valley
- (c) Toyen district
Mount Kappan (1 case)
- (d) Schinchiku district
Shakaro village (1 case)
- (e) Kagi district
Forest of Mount Ari
Tappan village
- (f) Ako district
Aryo valley
Maruyama near Shirinkaku Koshen
Plains between Ako and Chosha

Pescadores (Bôko) Islands

These comprise 63 islands in Formosa Strait

The houses are surrounded by the endemic area and therefore all the inhabitants are exposed to infection. Tsutsugamushi disease is not known to be contracted in the fields far from human dwellings this may be because a strong monsoon carries salt water and damages grasses and plants so producing unfavourable living conditions for *Trombicula akamushi*. The ground around the dwellings is protected by coral walls and the trombicula develops there. The trombicula develops in the ground inside the coral walls.

Rattus rattus rufescens [the common house rat in Formosa and the Pescadores Islands] was found heavily infested with the mites and rickettsiae were found in its tissues.

The season is from April to November only with a peak in June and July. Children are especially affected 70 per cent of cases being in children under 15 years of age and 38.6 per cent in those under 5 years. There are 30–80 cases a year the case mortality varies up to 21 per cent.

Borneo

A fatal case of mite fever in a European was reported by BESSEM in 1935. The infection was acquired in the western Division of the island. The diagnosis was confirmed serologically the serum agglutinating *Proteus OXA* to a titre of 1/1500 and being negative with *O179*. A case of tropical typhus was reported from Brunei in the north of the island in 1939.

New Guinea

The disease occurs in the Mandated Territory of New Guinea including New Britain and in Papua. Although DE ROOK reported in 1935

Investigation of the rats of infected localities also gave negative results except that the Weil Felix reaction was found to be positive in 6.2 per cent of the animals.

During the early months of 1943 the brains of 125 rats from infected localities have been examined by guinea-pig and rat inoculation.

Rickettsiae were isolated from one rat (*Rattus norvegicus*) and were passed through a white rat and two guinea-pigs all of which showed scrotal reactions. Rickettsiae were demonstrated in tunica smears of the infected guinea-pigs.

John W. D. McLean

GIBBONS R. J. Rocky Mountain Spotted Fever in Canada. *Proc 6th Pacific Sci. Conf.* 1939 Berkeley Calif. 1942 v. 5 573-5. Summary taken from *Rev. Applied Entom.* Ser. B. 1944 Jan. v. 3? Pt. 1 10-11.

Of the 12 authenticated cases of Rocky Mountain spotted fever that have been recorded in Canada three occurred in British Columbia in 1917 and 1936, eight in Alberta in 1923, 1935, 1936 and 1938 and one in Saskatchewan in 1929. There have been several other cases with clinical histories suggestive of this disease. *Dermacentor andersoni* Stiles is abundant in the dry belt of British Columbia east of the Coast Range and throughout southern Alberta and south-western Saskatchewan and has been recorded from Manitoba. It is slowly spreading westwards in British Columbia. It becomes active in late March and remains so for 1-3 months according to district. No cases of Rocky Mountain spotted fever have been recorded from eastern Canada although *D. variabilis* Say which transmits it in the eastern United States is found in Manitoba, parts of Saskatchewan and a few districts in Ontario and has been reported as far east as Labrador. *Haemaphysalis leporis palustris* Pack. believed to be of importance in the maintenance of *Dermacentor rickettsi* in animals is the most widely distributed tick in Canada and individuals collected in northern Manitoba induced reactions indicative of low grade Rocky Mountain spotted fever in guinea-pigs. During the spring and early summer of 1938 and 1939 29,500 and 27,600 ticks respectively, nearly all *Dermacentor andersoni* were collected in southern British Columbia and southern Alberta. No infections with Rocky Mountain spotted fever were found in those collected in 1938 but typical strains of virulent *Dermacentor rickettsi* were demonstrated from five out of about 300 lots comprising 9,000 ticks in 1939. All the positive ticks came from an area in south-eastern Alberta where fatal human cases had occurred in 1935 and 1936 though the negative ticks of the previous year had included many from this district. *Tularaemia* bacteria were isolated from several of the ticks in both years.

VARELA G. & MAZZOTTI L. Conservación del virus del tifo en *Triatoma barberi* Usinger 1939. (Survival of the Typhus Virus in *Triatoma barberi* Usinger 1939). *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico 1943 Sept. v. 4 No. 3 711-13. English summary (3 lines).

Twenty *T. barberi* which had fed on a guinea-pig infected with an orchitic strain of Rickettsiae were triturated on successive days and injected intraperitoneally into guinea-pigs.

The results were somewhat irregular but the last guinea-pig inoculated on the 33rd day had a short febrile attack and was found to be immune.

to the same orchitic strain so that the virus was shown to be capable of survival in the insect for at least 33 days John W D Megaw

DAVIS G L Studies on the Biology of the Argasid Tick *Ornithodoros nicolleti* Mosser J Parasitology 1943 Dec v 29 No 6 393-5

The argasid tick *Ornithodoros nicolleti* found in the states of Guerrero Puebla Colima and Jalisco Mexico feeds naturally on *Neotoma* man and dogs It also feeds readily on laboratory animals Feeding is rapid with the exception of some larvae which may require several days to complete engorgement Males mature first There are from 4 to 6 nymphal stages Based on 42 counts the number of eggs varied from 184 to 631 The number of eggs increases from the first to the third or fourth oviposition There is a tendency to oviposit a second time without further feeding Fertility was as high as 98 per cent in females that had not mated for at least one year

Ticks of this species experimentally transmit the rickettsiae of the spotted fevers of the United States of America Colombia and Brazil with marked facility Transmission through the egg was demonstrated in Brazilian and Colombian spotted fever *Rickettsia diaporica* and *Pasteurella tularensis* are not transmitted by bite but are conserved for long periods in the tissues of the tick as demonstrated by injection

DAVIS G L Experimental Transmission of the Rickettsiae of the Spotted Fevers of Brazil Colombia and the United States by the Argasid Tick *Ornithodoros nicolleti* Pub Health Rep Wash 1943 Nov 26 v 58 No 48 1742-4

Eight lots each consisting of 20 to 76 specimens of the tick *Ornithodoros nicolleti* were fed at the first nymph stage on guinea pigs infected with the spotted fevers of Brazil Colombia and the United States respectively

Some of the engorged nymphs belonging to six of the eight lots transmitted infection to fresh guinea pigs by their bites The scrotal reaction was caused in about one third of the infected guinea pigs and all the infected animals that were tested were found to have acquired immunity to the spotted fever of the United States

Transmission of infection through the egg was demonstrated in ticks infected with the Brazilian and Colombian strains of Rickettsiae The larval offspring of the infected ticks appeared to be more effective transmitters than their parents they caused more severe attacks and attached themselves more firmly to the guinea pigs

O. nicolleti is a Mexican species and is parasitic on man and dogs so that it seems hardly credible that Mexico should be free from the tick borne spotted fever which has so wide a distribution in North and South America yet no cases of the disease have yet been reported from Mexico

This report like the others from the Rocky Mountain Laboratory gives a highly condensed but clear account of a large series of carefully conducted experiments so that its readers will observe with regret a hint that the work has been interrupted probably owing to the exigencies of war

[The nomenclature of the tick borne fever of the typhus group prevalent in so many parts of the American Continent ought to be unified and it is to be hoped that a suitable descriptive name will be selected

[May 1944]

So long as North American workers adhered to the name Rocky Mountain spotted fever it would have been tactless to advocate a change but now that the Rocky Mountain experts themselves show a tendency to discard the time honoured name and to adopt one indicating that the disease has a wider range they must be prepared to consider the advantages of a suitable descriptive name which would be applicable to the disease wherever it occurs. At present upwards of 20 different names are used from time to time for a disease which has been shown to be one and the same. My own suggestions would be American tick typhus or tick typhus of the Rocky Mountain type. Although the latter name is longer it has the great advantage of retaining the association with the classical type of the disease.]

John W. D. Megaw

BUSTAMANTE M. E. & VARELA G. Una nueva rickettsiosis en Mexico. Existencia de la fiebre Manchada Americana en los estados de Sinaloa y Sonora. A Rickettsial Disease new to Mexico. Rocky Mountain Spotted Fever in the States of Sinaloa and Sonora. *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico 1943 Sept v. 4 No. 3 189-210 1 map 4 graphs & 2 coloured figs. on 1 pl 12 ref. English summary.

A severe fever has been known for many years near the West Coast of Mexico. It went by the names fever of Chochila or pinta fever (spotted fever). In 1925 it was suspected by HOFFMANN to be Rocky Mountain spotted fever but after investigation the opinion was formed that it was of a different type and the name spotted fever of Chochila was adopted.

In 1943 an investigation was started in the States of Sinaloa and Sonora situated about 108°W of Greenwich and 26°N latitude. From August till December 1942 79 cases of pinta fever with 50 deaths were reported from these States. No cases occurred from the end of January till late July, this being the dry season when agricultural operations were not in progress so that the inhabitants were not brought into contact with ticks.

During the first six months of 1943 many ticks were collected 2190 were triturated and injected intraperitoneally into 176 guinea pigs but clear evidence of infection has not yet been obtained. Further investigation of the ticks is proceeding.

A patient was attacked in July 1943 with the usual symptoms on the 13th day of the illness two guinea pigs were inoculated intraperitoneally each with 0.5 cc of the patient's blood. The animals developed fever and orchitis and the infection was passed through other guinea pigs.

Guinea pigs vaccinated 71 days beforehand with 1.0 cc. of Cox's vaccine against Rocky Mountain fever were found to be immune against infection.

From these experiments it was concluded that the disease was the same as Rocky Mountain spotted fever and in view of the discovery of the existence of this disease in Brazil, Colombia, Texas and now in Mexico it is suggested that a suitable name is only slightly less suitable than the original title which has become established by many years of use and is not likely to be abandoned without a struggle.]

John W. D. Megaw

ANIGSTEIN L & BADER M N Preliminary Report on Investigations of Bullis Fever Texas Reports on Biol & Med 1943 v 1 No 3 298

The authors refer to Bullis fever [see this *Bulletin* 1944 v 41 34 209] and report that from a collection of 500 *Amblyomma americanum* a strain of an infectious agent was established in guineapigs. An intracytoplasmic Rickettsia was found and guineapigs convalescent from infection induced by ticks were immune to reinfection with a human strain of the Bullis fever Rickettsia but were not immune to Rocky Mountain fever and Q fever strains. It seems probable therefore that the Rickettsia now isolated from the ticks is the cause of Bullis fever.

Charles Wilcocks

ANIGSTEIN L The Problem of the Etiology of Tropical Typhus in Malaya *Proc 6th Pacific Sci Congr 1939* Berkeley Calif 1942 v 5 619-22 [Summary taken from *Rev Applied Entom Ser B* 1944 Jan v 32 Pt 1 11]

The greater part of this report deals with the author's own investigations on the causal agent of the rural form of Malayan tropical typhus which was later shown to be identical with tsutsugamushi disease. He discusses the relation between typhus rickettsiae and *Proteus* 1 and inclines to the view that they are the parasitic and saprophytic stages of the same organism but is undecided as to whether the transformation to the saprophytic phase takes place as the result of a possible life cycle of the rickettsia or whether the proteus appears as an abrupt mutation. Although the human louse [*Pediculus humanus* L.] plays no part in transmission of the Malayan disease investigations were carried out to determine whether it could be artificially infected and so be used as a biological medium and the appearance of the organism in it compared with that of cultures on artificial media. Some 2000 lice were therefore imported and infected by feeding or by anal injection. Minute dumb bell shaped diplococci and delicate rods as well as coccobacilli showing bipolar staining could be found in masses in gut smears after eight days of feeding and still more conclusive results were obtained by inoculation of patients blood which resulted in the appearance of enormous numbers of organisms resembling the rickettsiae of tsutsugamushi disease in morphology and staining properties. Organisms of the same type were demonstrated in the tunica vaginalis of guineapigs and rats inoculated with the gut emulsion of artificially infected lice. There was no evidence that multiplication took place intracellularly. Cultures of strains from man rodents and lice on Hottinger broth and chocolate blood agar were highly pleomorphic and had pathogenic properties correlated with their morphological type. These phenomena together with their serological properties suggested that they were biological phases of the tsutsugamushi rickettsia one of them being the saprophytic proteus type.

MORISHITA K Tsutsugamushi Disease Its Epidemiology in Formosa *Proc 6th Pacific Sci Congr 1939* Berkeley Calif 1942 v 5 639-47 [11 refs] [Summary taken from *Rev Applied Entom Ser B* 1944 Jan v 32 Pt 1 12]

The epidemiology of tsutsugamushi disease on the main island of Formosa and in the Pescadores Islands is discussed separately on the

PLAGUE

DE VILLAFANE LASTRA T GOOBAR J K & WOLAJ I F Epidemiologia de la peste en la provincia de Cordoba {Epidemiology of Plague in Cordoba Argentina} Primer Congreso Vac Enfermedades Endemo Epidemicas Buenos Aires 1940 Nos 9-13 594-6

The authors set out the arguments for the existence in Cordoba of sylvatic plague and its difference from the ordinary rat plague. The field rodents concerned as has now often been pointed out are mus mus and Graomys. They conclude (1) It is not possible to regard the rat as being the sole reservoir of plague in spite of its being the chief agent in large epidemics. (2) Plague evidently exists in latent form in the forest and agricultural regions of the north and north east and these regions evidently constitute a huge source of infection among the sylvatic rodents. (3) The majority of the human cases of the north and north-east regions of Cordoba are due to these rodents. (4) Sylvatic plague is uncontrollable in the actual circumstances and constitutes a permanent focus of the disease capable of promoting the murine epizootic and thus menacing the urban centres.

W F Harvey

MEYER K F HOLDENFRIED R BURROUGHS A L & JAWET E Sylvatic Plague Studies IV Inapparent Latent Sylvatic Plague in Ground Squirrels in Central California J Infect Dis 1943 Sept-Oct 1943 No 5 144-57 3 figs {23 refs}

An early problem in the epidemiology of plague was the explanation of how the disease was carried over from season to season in the rodent population. It became evident that plague persisted in enzootic areas but the Indian Plague Commission disapproved of the idea that chronic or relapsing rat plague was concerned in the process. Much more light on this matter has come from investigations into sylvatic plague with its underground persistence and its widespread existence without much development of either rat plague or human plague. The authors discuss the significance and importance of the discovery of plague in an area of the Calaveras Reservoir, California, where for the past three years a population study of the ground squirrel (*Citellus beecheyi*) has been in progress. Latent plague has to be distinguished from chronic plague. The former represents a stage of survival of plague bacilli in the tissues of wild rodent. Such latency has been proved but in order that the disease may become propagated among rodents there must develop a plague bacteraemia before vector fleas can become infected. In the present research it has been shown that gross macroscopic lesions are not necessarily present in rodents affected with latent plague and that surveys depending entirely on such examinations are not only incomplete but in fact futile. From the data it appears not unlikely that the persistence of a latent infection in the Beechey ground squirrel is probably confined to a short period of one or two months. In this type of plague there are no inflammatory and no encapsulating lesions. There may however be occasional bacteraemias in the affected squirrels which provide an opportunity for fleas to become infected and thus a slumbering and latent plague enzootic is maintained in existence. In the area under survey examination of 259 squirrels shot during July and 117 killed

in August revealed no lesions generally considered indicative of plague. The spleen, liver and lymphatic nodes from four to five squirrels were pooled, pulped, suspended in salt solution and injected subcutaneously into guineapigs. During a period of four months a total of 94 pools from 440 squirrels were tested. Fifteen of the pools induced fatal plague infection in guineapigs. During September and October on the other hand testing of organ pools furnished completely negative results.

W F Harvey

MILMORE B K. Harborage of *Rattus rattus alexandrinus*. *Pub Health Rep Wash* 1943 Oct 8 v 58 No 41 1507-9 [16 refs]

Contrary to the general belief that *R. r. alexandrinus* inhabits only upper parts of buildings the observations presented show that this species sometimes burrows in the ground and may be encountered under buildings and in basements and sewers. Most descriptions overemphasize the differences in harboring habits of the common species of rats.

DE VILLAFANE LASTRA T & RODEIRO M. El edema regional en la peste (Nota previa) [Regional Oedema in Plague]. *Primer Congr Nac Enfermedades Endemo Epidémicas Buenos Aires* 1942 Nov 9-13 568-9

In plague two chief varieties of oedema occur: one acute, hot, without pitting, and the other chronic, residual, deforming the locality without alteration of the skin. The latter has to be differentiated from the oedema of lymphogranuloma inguinale and is exemplified by two cases described by the authors in which plague cultures were positive and the Frei test negative. As both diseases may exist in the same locality the diagnosis is sometimes difficult.

W F Harvey

DE VILLAFANE LASTRA T & RODEIRO M. Estudio de la meningitis pestosa [Plague Meningitis]. *Primer Congr Nac Enfermedades Endemo Epidémicas Buenos Aires* 1942 Nov 9-13 579-85

The authors have met with four cases of meningeal plague as a complication of the bubonic type, although one of these patients also developed a septicaemia. Symptoms were delirium, excitement, mental confusion, headache, hallucinations, disorders of speech, neck rigidity, Kernig's sign and cerebrospinal fluid under pressure. Similar symptoms may occur in various infections such as brucellosis, typhoid and pneumonia with relative frequency and without great significance. Nevertheless it must be noted that in plague these symptoms do not have a favourable significance and usually indicate the beginning of true plague meningitis, which is fatal. In meningeal cases with clear cerebrospinal fluid, culture has been negative for *P. pestis*. The four cases of plague meningitis studied all showed purulent turbidity of the spinal fluid and afforded plague cultures. Since the authors began to study particularly the nervous system in plague cases with a complete examination of the cerebrospinal fluid, they have discovered four cases of plague meningitis out of 39 hospital admissions for plague, and they believe that a meningeal localization of the plague bacillus would be found with greater frequency if such systematic examination were carried out more often.

W F Harvey

DE VILLAFANE LASTRA T GOOBAR J K RODEIRO M & VIDELA L. F. Tratamiento de la peste de Oriente [Treatment of Plague] Primer Congr Nac Enfermedades Endemo-Epidémicas Buenos Aires 1942 Nov 9-13 586-93 9 figs

The statistics on which pronouncement is based were —a mortality of 70.87 per cent during 1940 when serum was sometimes employed on a large scale and of 23.33 per cent for 39 patients treated with cibazol [sulphathiazole]. The latter figure of 23.33 per cent is more correctly reduced to 14.28 per cent when four of the patients who died within the first 24 hours of admission to hospital are excluded. All cases were true plague infections proved bacteriologically. The failure of previous trials of sulphanilamide and sulphapyridine have convinced the authors that sulphathiazole is the treatment of choice in plague. They place no faith in the utility of serum treatment. Chemotherapy must be started early and with high doses (10 gm in the adult) so as to maintain a high concentration in the blood (greater if possible than 8 mgm per cent). Such dosage [10 gm daily] should be maintained until the condition has become normal unless there is manifest intolerance to the drug. In one case after the administration of 10 gm on the first and second days the patient's temperature rose and the dose was then increased to 16 gm daily up to the seventh day making a total dosage of 110 gm. The fever terminated by lysis becoming normal on the 10th day.

W. F. Harvey

JAWETZ E & MEYER H. F. Avirulent Strains of *Pasteurella pestis* J Infect Dis 1943 Sept-Oct v 73 No 2 124-43 1 chart & 1 pl [35 refs]

Controversy regarding the use of killed or live plague vaccine has now continued for a long time and opinion seems to be veering towards the use of the live vaccine. Such a vaccine must of course be safe and must have superiority in immunogenic power. For the routine test of harmlessness performed with isolated plague strains 0.2 ml of a 10^{-4} broth culture dilution (ca 5 000-10 000 organisms) were inoculated intraperitoneally into groups of mice. This particular dose was selected because it was certain not to produce any primary toxic effects while for the test of immunogenic power dilutions of 300 million per ml suspensions ranging from 10^{-3} to 10^{-6} were inoculated subcutaneously in 0.2 ml amounts into mice and in 0.2 ml or 1.0 ml amounts into guinea-pigs. The standard challenge test dose was administered on the 14th day. Three methods for obtaining avirulent strains were employed: (1) growth of virulent strains for long periods in alcohol broth at high temperature; (2) isolation from virulent strains kept some time in the refrigerator of single avirulent colonies and prolonged incubation of broth cultures at 37°C; (3) passage of virulent strains through immune animals and their recovery by culture from the infected immune animal.

The definition given of an avirulent plague bacillus is that it shall not be able to cause death of the test animal unless introduced in number sufficient to produce toxic death without multiplication. Insistence is made on the necessity for isolation of the avirulent organism which is to be used as vaccine as a single cell. If this is done experience has shown that there is no danger of reversion to virulence. Reference is made to the great differences found among experimental animals in

their resistance to plague toxin and to different avirulent strains. The authors incline to the idea that such differences may only be quantitative and depend on what SCHUETZE [this *Bulletin* 1932 v 29 676 1939 v 36 974] ascribed to the possession of greater or less amounts of envelope. At all events it seems probable that antigenic constituents of importance in immunization may differ in their resistance to heat and that a strain possessing one type of antigen may be immunogenic for one species of animal and another type for another species. The possession of an appreciable amount of envelope might account for the guinea-pig and rat antigens respectively which have been postulated by OTTEN [this *Bulletin* 1937 v 34 416 1942 v 39 309].

It is concluded that properly tested live plague vaccines are safe and superior in immunogenic activity for experimental animals to any killed preparation used at the present time. *W F Harvey*

CHOLERA

SEN GUPTA S K. Prevalent Types of Cholera Vibrio [Correspondence] *Indian Med Ga* 1943 Sept v 78 No 9 464

At the Bower Disease Research Department School of Tropical Medicine Calcutta the following isolations from cases of cholera (diagnosed clinically) were made in the years named —

Year	Cases studied	Vibrio cholerae isolated		No vibrio recovered
		Inaba	Ogawa	
1941	250 [2.05]	71	76	58
1942	26	45	70	111
1943	266	nil	154	112

Later I strain was isolated

The Inaba subtype has been declining since 1941 and this fact is important in the preparation of vaccine which for use in the Calcutta area should consist principally of the Ogawa subtype. It is emphasized that in future great care should be taken to type the vibrios during epidemics and to supply the appropriate vaccine.

Charles Wilcocks

GALLUT Jean & GRABAR P. Recherches immunochimiques sur le vibron cholérique. I. Etude quantitative de la réaction de précipitation de l'antigène glucolipidique par l'immunoserum de lapin [Quantitative Precipitation of Cholera glucolipidic Antigen by Immune Serum] *Ann Inst Pasteur* 1943 July-Aug v 69 Nos 7-8 250-53

In a recent publication GALLUT [this *Bulletin* 1943 v 40 910] set out the evidence that the cholera vibrio contains a glucolipidic complex which is the somatic O antigen of this organism and that the toxin itself contains both glucolipidic and protein active elements. In

the present study variable quantities of the glucolipidic antigen were added to a fixed amount of rabbit antiserum and the quantity of antibody precipitated determined by estimation of nitrogen. From the data obtained (1) the ratio mgm of λ of the antibody/mgm of glucolipid and (2) the combining molecular weights of glucolipid antigen and antibody were evaluated. The methods thus developed showed that notable differences were apparent in the immunological behaviour of vibrios belonging even to the same serological group and that these might be utilized for the classification of cholera vibrios in general.

W. F. HARTLEY

GALLUT, Jean & GRABAR, P. Recherches immunochimiques sur le vibron cholérique. II. Sur les constituants de la toxine cholérique [The Constitution of the Cholera Toxin] *Ann Inst Pasteur* 1943 Sept-Oct v 69 Nos 9-10 307-9 2 figs

Two questions arise for answer: (1) Is the toxin made up of several antigens? (2) Does the glucolipidic complex of the toxin differ from the glucolipidic extract of the vibrio?

(1) Since an antitoxin serum exhausted by saturation with glucolipid is no longer precipitated by the toxin it would appear that the toxin possesses no other antigen than the glucolipid.

(2) By comparison of the curves of precipitation obtained with an antiglucolipidic serum tested with (1) the bacterial glucolipid (A) (2) the toxin (C) and (3) the glucolipid of the toxin (B) respectively it is found that the two latter are higher than the first. As the antiglucolipidic serum can only contain antibody to its own injected antigen the deduction is admissible that the differences found are due to an antigenic composition different from the glucolipid of the toxin. The author draws the conclusion from his experiments that when first elaborated the toxin contains a complex glucolipid antigen which subsequently is split into a simpler glucolipid (such as that of the extract of the vibrios) and a substance which is not precipitated by the immune serum. [See also this *Bulletin* 1943 v 40 910] W. F. HARTLEY

YAWS

KINELL, J. Yaws. Report of a Case appearing in a White Man. *U.S. Nat. Med. Bull.* 1944 Jan v 42 No 1 187-92 2 figs

[Yaws probably the commonest of diseases among native children in the tropics is rarely seen in white races or outside the tropics and sub-tropics unless we regard the button scurvy of Ireland, the sibbens of Scotland and rade-yge of Scandinavia as yaws, a question which has never yet been decided or unless we look upon yaws and syphilis as fundamentally the same. To find a case of yaws in a white man, a United States soldier in an island of the South Pacific where syphilis is said to be absent is consequently worthy of record.]

The rarity of yaws in Europeans in the tropics is ascribed partly to the wearing of more clothes, partly to the higher standards of hygiene in general and partly to the absence of close contact with the native. These facts however would not exclude insect transmission as by *Hippelates pallipes* which is thought to be probable (see this *Bulletin* 1937 v 34 961-963 1936 v 33 961).

The patient whose case is recorded here was a staff sergeant 20 years of age who had been in the district for fifteen months. He often paid visits to native friends and fondled their children and being an aviation mechanic he was liable to cuts abrasions and scratches on his hands and forearms. His primary lesion mother law was on the flexor surface of the right wrist. It appears to have been quite typical [but no mention is made of any preliminary fever or malaise which would probably be present in an adult]. Three months later (i.e. after rather longer than the usual interval) secondaries also typical began to appear elsewhere on the body—root of the penis gluteal furrow finger palm popliteal space cheek chin—together with gland enlargement. Treatment was arranged for a complete course of ten intravenous injections of neoarsphenamine and the same number of bismuth salicylate injections intramuscularly at first at 4 day intervals later at weekly intervals. As usual in yaws healing was in progress after two injections and 21 days after starting treatment the patient was transferred with all his lesions healed. He showed some degree of sensitivity to neoarsphenamine evidenced by a generalized dusky red maculo-papular rash and when he left mapharsen was about to be substituted. He strenuously denied having run any risk of contracting venereal disease moreover syphilis was not seen in the area as already stated.

H Harold Scott

LEPROSY

BARROS DE SÁ M. Estudo analítico da reacção de sedimentação do sangue (em 100 leprosos da Leprosaria de Macasana) [Study of Blood-Corpuscle Sedimentation in One Hundred Lepers at the Macasana Leprosarium] *Arquivos da Escola Méd Cirurg de Nova Goa* Ser A 1941 No 15 179-220 [40 refs]

Just twenty years ago PUXEDDU recorded the rapidity of sedimentation of red cells in leprosy particularly in the active stages of the disease [see this *Bulletin* 1924 v 21 874]. He stated that the time varied between 60 and 90 minutes whereas in normal persons it was 7 hours or more. Varying records have been made since that time and the author has done a useful piece of work in making a study of 50 male and 50 female lepers in varying stages of nervous nodular and mixed forms of the disease. He found that the variations between one leper and another were so great that the test was of no real value in diagnosis or prognosis generally but that for each individual patient it might have considerable value in enabling one to judge of progress and of the results of treatment. This means that there is no general rate or formula which will serve as a standard but that each patient should have a curve of sedimentation plotted by frequently repeated tests and useful information could be gathered from such a chart [See also this *Bulletin* 1926 v 23 515 1927 v 24 215 1928 v 25 209 978 979 1929 v 26 341 1039 1930 v 27 338 1931 v 28 960 961 1933 v 30 559 1934 v 31 551].

H Harold Scott

BASOMBRIO G MOM A M NOUSSITOU F & LEON R C Estudios sobre reactividad cutanea experimental en lepra (Comunicación preliminar) [On Skin Reactions in Leprosy] *Rev Argentina de Dermatosisifilologia* 1943 Sept v 27 No 3 406-11 1 chart English summary

These findings if confirmed will have a considerable bearing on the value and interpretation of the lepromin reaction. The authors have tested the effects of epidermal contact and intradermal injection of 2-4 dinitrochlorobenzene in acetone in cases of tuberculoid leprosy and of leproma and in non leprous subjects for contact they used dilutions of 1/1000 1/100 1/50 and 1/10 while for the intradermal test the 1/1000 solution was diluted to 1/1000 with physiological saline and 0.2 cc injected. The results were compared with those obtained with whole lepromin prepared by Hava's method. A chart shows the reactivity of the skin as erythema or vesication. In the lepromatous patients the reaction is more marked is apparent earlier and evolves more rapidly than in cases of tuberculoid leprosy and non leprous controls but the characters differ little from those in the skin of a subject on a diet in which alkali and chlorides are a prominent feature. In intensity and time of evolution the effect were the same as those with lepromin. It is inferred therefore that the so-called specific lepromin reaction can be simulated by a non protein non specific irritant or excitant dinitrochlorobenzene. [This is a preliminary communication further work will be awaited with interest.]

H Harold Scott

GONZALEZ GUZMA I Estudio de los granulocitos sanguineos de los leprosos [Study of the Granulocytes in Leprosy] *Arch Latino Americanas de Cardiol y Hematol* 1943 May-Aug v 13 Nos 3 & 4 119-38 1 fig [15 refs]

[This article is a useful set off to those which record all sorts of blood changes in leprosy. Unfortunately the number of cases studied here is very small and it would seem that rather a lot is claimed from few data.] The author has studied the numbers of leucocytes—polymorphonuclears eosinophiles and basophiles—and their characters in 33 lepers nine with the diffuse cutaneous form seven nodular six tuberculoid five of the nervous and five of the Lucio form [see this Bulletin 1943 v 40 927] and one mixed. Totals and percentages are given for each. The polymorphonuclear range was between 62.6 per cent in the mixed case and 44.5 in the nervous cases the nodular being 56.8 per cent and the totals well within the normal limits except for one patient with the nodular form who had 12.76 per cent but another in the same group had only 1.870. A tendency towards leucopenia was thus more common leucocytes rare. The Arnett Index showed a deviation to the left. Eosinophiles also were within the normal limits except in the tuberculoid form where the average was 6.2 per cent the nervous had 3.8 and the other 1-2 per cent. But says the author unfortunately I was not able to find out whether any intestinal parasites or any other condition likely to cause eosinophilia was present in the six patients with this type of leprosy. [This would seem to deprive the observation of any value.] The basophile percentage also did not exceed normal limits though it was highest 0.9 in the diffuse cutaneous and the tuberculoid forms.]

H Harold Scott

Bosq P Eliminación de los bacilos de Hansen a través de la epidermis de los enfermos de lepra [Discharge of Bacilli by the Skin in Lepers] *Rev Argentina de Dermatosisifilologia* 1943 Sept v 27 No 3 423-5 3 figs

The presence of Hansen's bacilli in the deeper parts of the skin is well known but examination of the superficial layers is usually barren of results. FOOTE in 1941 found none positive among 63 examined and ABERASTURY found only one among 163 but in that case they were present in large numbers in macrophages and in isolated groups. The present author however has recorded finding them at times in large numbers in macrophages and sparsely with the epidermal scales. He scrapes gently the upper layers of squamous epithelium without injuring the healthy epidermis and mixes the powdery product with a drop of Meyer's albumin on a slide. Before staining he waits for 24 hours because he finds that immediate staining results in incomplete decolorization of the smear and some of the horny scales retain the red of the carbol fuchsin. He is of opinion that the stage of epidermic elimination is transient but the cause of the intermittency calls for further investigation. On the other hand it may be constant for certain patients and if that is the case there is need for more investigation as to why one should eliminate the bacilli and others do not. *H Harold Scott*

Soto M C Consideraciones clinicas sobre las complicaciones oculares de la lepra [The Eye Complications of Leprosy] *Rev Argentina de Dermatosisifilologia* 1943 Sept v 27 No 3 412-22 4 figs [37 refs]

The author's remarks are based on a study of 300 cases in the Rosario Hospital. He enumerates and comments on the various ocular lesions seen in leprosy as they affect the eyelids and adjacent regions nasal malar temporal and frontal and the conjunctiva the lachrymal glands and ducts the cornea sclerotic and iris. Many (perhaps all) are merely local manifestations of the general disease often occurring as complications some years after the cutaneous manifestations appear but sometimes assuming an acute form accompanying or as part of the leprous reaction. The author has not observed lesions of the palpebral conjunctiva attributable to leprosy but a scraping taken at the reflexion of this membrane at the palpebral border may reveal the lepra bacillus. He states that the leprous reaction is a complication which varies according to the clinical form of the disease. In tuberculoid cases the effect falls on the integuments (lids) and not on the globe but in lepromatous patients the results may be very serious as regards vision. Iritis or irido cyclitis may cause blindness. Again the eye lesions may arise and progress quite independently of any general reaction.

Two theories have been advanced to account for the involvement of the globe in leprosy. The *exogenous* according to which the lesions of the lids the mucosa and the adjacent eye structures arise by continuity and spread from the more superficial to the deeper tissues conjunctiva sclerotic and cornea and then to the iris and ciliary body. The *endogenous* or vascular spread based on the facts that often they arise in the febrile period of a leprous reaction when there is a bacteraemia and that the lesions are usually bilateral. There is a third theory that the bacilli pass via the nerves but none of these theories is very convincing. *H Harold Scott*

SOTO M C Algunas consideraciones sobre el tratamiento de las complicaciones oculares de la lepra [Remarks on the Treatment of the Ocular Complications of Leprosy] *Rev Argentina de Dermatofisiología* 1943 Sept 1 27 No 3 429-33 [11 refs]

The treatment of the eye complications of leprosy is divided by the author into (1) Medical (2) Fundamental or aetiological (3) Subsidiary or adjuvant (4) Surgical By the second he means treatment of the leprosy itself by chaulmoogra. The proportion of properly treated patients who develop eye complications is to be the subject of another article The third includes protein shock pyretotherapy vitamins etc

He mentions treatment of the lids by carbonic acid snow trichloroacetic acid and emollients of iritis irido-cyclitis and keratitis by atropine diionine yellow oxide of mercury and iontophoresis in particular ionization with a soluble derivative of chaulmoogra Surgical treatment entails dealing with retracting scars ectropion lagophthalmos extirpation of lepromata of the lids and localized episcleral formations [The paper is a slight one and in the main that is except for the treatment of the basic disease leprosy the treatment of ocular complications differs in no way from that of the same complications of non leprosy] *H Harold Scott*

FIOL H & ZAMBRANO J La vitamina B₁ en el tratamiento de las complicaciones oculares de la lepra [Vitamin B₁ in the Treatment of Ocular Complications of Leprosy] *Rev Argentina de Dermatofisiología* 1943 Sept 1 27 No 3 439-42 [14 refs]

Others have reported benefit from the use of vitamin B₁ in patients with trigeminal neuralgia in keratitis and corneal ulceration associated with avitaminoses so the authors have tried the same treatment in the eye complications of leprosy with irido-cyclitis (3 cases) with nodular keratitis (2) with these two conditions combined (2) and nodular iritis and conjunctivitis with episcleritis (1 each) They have used hydrochloride of aneurin or thiamin in doses of 25-50 m^m daily or on alternate days in some cases injected intramuscularly or (better) intravenously for a course of 5-10 injections Relapse occurs some months after the treatment is stopped but this clears up on renewal of the treatment Smaller doses given continuously act prophylactically then why cease treatment and allow relapses to occur? The authors do not claim that the vitamin treatment is curative but that it diminishes the intensity and duration of the lesions and so delays the onset of loss of vision *H Harold Scott*

FIOL H & CALCAGNO O Ensayo e tratamiento de la lepra con un derivado coloidal y timolado del ácido chaulmoogrico el timol hidrochaulmoogricosol [Treatment of Leprosy with Thymol hydrochaulmoogricosol a Colloid Derivative of Chaulmoogra] *Rev Argentina de Dermatofisiología* 1943 Sept 1 27 No 3 426-8

This preparation is a combination of thymol with the active principles of chaulmoogra and is obtained by treating a colloidal solution of the acid with thymol the final product containing 0.012 gm thymol

and 0.002–0.006 gm of chaulmoogric acid in 2 cc. It may be administered intravenously in doses of 2–6 cc intramuscularly 6 cc or intradermally in doses up to 10 cc each thrice weekly. So far 28 patients with the lepromatous form have been treated of these 10 have improved 18 have remained unaffected none was made worse. Of six with tuberculoid leprosy five have improved the other remaining stationary. Two of the mixed form have been thus treated but so far without change. Some patients had had to cease treatment by the chaulmoogra oil and the ethylic esters owing to ocular complications or leprous reactions but they tolerated the new preparation well. As the authors acknowledge they have used it for four months only far too short a time to judge of permanent results. *H Harold Scott*

FIOL H. Consideraciones sobre el tratamiento de la lepra y resultados obtenidos despues de un año de observacion en el Sanatorio-Colonia. Buenos Aires. [Results of the Treatment of Leprosy during the Year at the Leper Colony 'Buenos Aires'] *Rev Argentina de Dermatosisifilologia* 1943 Sept \ 27 No 3 434–8

This is a report on the results obtained during the year [presumably 1942] since the colony was opened [dates are not given anywhere]. These results are stated in general terms no figures or details being given beyond the fact that of a total of 369 patients five have been released conditionally 205 have improved 93 have remained stationary 29 are worse and 37 have died.

Chaulmoogra oil has been the drug used the Heiser Mercado mixture containing chaulmoogra oil 7 olive oil 3 resorcin 0.3 creosote 0.4 camphor 0.15 modified to contain chaulmoogra oil 7 cod liver oil with 5 per cent camphor 3 cc benzyl cinnamate 0.05 gm cholesterol 0.1 gm resorcin 0.3 gm. The ethylic esters were used with 0.5 per cent iodine and 4 per cent creosote in intradermic and hypodermic infiltrations up to 10 or 15 cc at a session. Not all patients can tolerate the high doses but when they can the results are very satisfactory. Intolerance is shown by local pain lepra reaction acute eye complications erysipelatoid with fever and these necessitate intermission in treatment. The use of the oil or of the thymol chaulmoogric acid [see above] administered intra or hypodermically up to 10 cc by multiple puncture has given very encouraging results.

As adjuvants calcium gluconate shock treatment by protein and autohaemotherapy or milk injection have been given. Diphtheria antitoxin in doses of 1–3 cc every 10–12 days for periods up to a year has been tried in 10 cases without benefit. Leprous reactions are treated by 1 per cent tartar emetic 2 cc daily or by adrenaline 1 per cent [so stated] calcium cholesterol alkalis and a diet of milk fruit and vegetables. In ocular complications vitamin B₁ intensively by the intramuscular or intravenous route has given encouraging results. The same has been used for painful neuritis. For ulcers of the leg cleanliness congestion by elastic bandage the use of infra red rays infiltration with 1 per cent novocaine blockage of the sympathetic terminal fibres to maintain capillary dilatation are all mentioned but says the author the secret of cure of ulcers in many cases is avoidance of excessive manipulation rather than therapeutic applications. Local cautery by carbonic acid snow by trichloroacetic acid or galvanotherapy has given benefit in certain cases and it seems also to affect lesions distant from the site treated. *PALDROCK* [this *Bulletin* 1942

v 39 462] believes this is due to vaccination from the bacilli destroyed Co-existent disease such as syphilis tuberculosis malaria and cardiac hepatic or renal conditions must receive attention and appropriate treatment

H Harold Scott

HELMINTHIASIS

BURROWS R *Studies on the Intestinal Parasites of Mental Patients*
Amer J Hyg 1943 Nov v 38 No 3 293-305 5 figs [21 refs]

The author examined 3 000 stools from 2 000 patients in the South Carolina State Mental Hospital and anal swabs from 1 383 patients. A saline purge was given before the stool was collected and every stool was examined on the day on which it was passed. Methods included the simple smear iodine-stained smears preparations stained with iron haematoxylin when the diagnosis of amoebic infections was doubtful anal swabs (Hall's cellophane swab) for *Enterobius* floatations of soil samples from the exercise yards and examinations of samples taken from walls door knobs toilet seats furniture etc by means of strips of cellulose tape 5 cm long repeatedly pressed over the areas examined and then examined under the microscope.

There were 637 newly admitted patients of whom 376 were white people and 261 coloured. They came from homes of all grades from wealth to poverty from rural and urban districts from coastal areas mountains and sandy plateaux.

The following are the species of parasites found and the total percentage rates found in this group of male and female patients: *Entamoeba histolytica* (1.7) *E. coli* (16.3) *E. nana* (12.4) *Iodamoeba uilliamsi* (0.3) *Chilomastix mesnili* (3.3) *Trichomonas hominis* (3.3) *Giardia intestinalis* (1.9) *Ascaris lumbricoides* (1.4) *Necator americanus* (4.5) *Strongyloides stercoralis* (0.8) *Enterobius vermicularis* (0.5) *Trichuris trichiura* (0.8) and *Hymenolepis nana* (0.3).

The proportion of infected persons was much higher among 1 418 patients not newly admitted. These included most of the 142 patients previously surveyed by YOUNG & HAM (this Bulletin 1941 v 38 370) who found that 90 per cent of these 142 were infested and that some harboured seven or eight species of parasite. Burrows found that both the number of species per patient and the intensity of the worm infestation increased with the length of residence in the institution. This increase during residence was shown by egg counts done on 117 women who had been in hospital either one or over five years. Of these 87 per cent had very heavy *Trichuris* infestations of over 12 000 eggs per gm (the highest was 181 000) 5 per cent had over 100 000 and 37 per cent had over 50 000.

For comparisons of the infestations of males and females and of white and coloured patients the paper itself must be consulted.

The relation of defective personal habits of the patients to the rates of infestation was studied. These habits no doubt increased the incidence and degree of infestation. Attendants dealing with the more deteriorated patients showed higher infestations than those who dealt with other patients. A steam hood for the sterilization of small areas of soil in the exercise yards is described and figured.

G Lapage

BARNETT L Hydatid Disease in New Zealand A Brief Note on Incidence and Prevention during the Year 1942 *New Zealand Med J* 1943 Dec v 42 No 232 260-61

WESLEY C Embolus of Left Femoral Artery due to a Hydatid Cyst *Med J Australia* 1943 Dec 11 v 2 No 24 483

THIAGARAJAH P R The Aetiology of the Anaemia of Ankylostomiasis in association with Malnutrition during Pregnancy Reprinted from *Trans Soc Med Officers of Health of Ceylon* 1942 Dec v 11 14 pp [37 refs]

In Ceylon the high death rates of mothers and children associated with pregnancy and childbirth as well as abortions premature births and associated illnesses are largely due to anaemia caused by hook worm and malarial infections chiefly the former [see WICKRAMASURIYA *Bulletin of Hygiene* 1939 v 14 665] In 1939 haemoglobin estimations were made in 1119 women admitted to the De Soysa Lying in Home only 150 women had over 50 per cent The anaemia of these women is of the nutritional deficiency type with hypochromia and microcytosis in the author's opinion it is due partly to a deficiency of iron in the diet and partly to defective absorption of iron owing to damage to the intestinal mucosa by the worms [Other workers (e.g. NAPIER *et al* this *Bulletin* 1942 v 39 100 HILL & ANDREWS *ibid* 1943 v 40 324 HEILIG *ibid* 68) think that direct loss of blood with a deficient supply of iron in the food is the main cause of the anaemia of hookworm infection] The author emphasizes the need for iron therapy as a follow up after disinfection by anthelmintics [In severe anaemia e.g. haemoglobin below 40 per cent some workers insist that iron should be given to increase the haemoglobin before anthelmintics are used and of course continued afterwards] J F Corson

MAKHILINA R M [An Experiment on the Sanitation of a Focus of Ankylostomiasis] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 5 72-6 [In Russian]

The author reports on a village near Batum where the people are engaged in agriculture the sanitary practices are poor and hookworm and *Ascaris* infestation is considerable Treatment with santonin and carbon tetrachloride was given [doses not stated] and between the spring and autumn of 1939 the hookworm infestation rate was reduced from 48.4 to 6.3 per cent [Fulleborn's method] nevertheless 21.4 per cent of those treated remained infested Intensity of infestation was reduced from 4700 to 410 eggs per gm of faeces [Stoll method] There was an average increase of 6.2 per cent in the haemoglobin of treated persons

The author concludes that systematic treatment does not give constant results without improvement of sanitation G Lapač

BEATTIE J HERBERT P H WECHTEL C & STEELE C W Studies on Hepatic Dysfunction I Carbon Tetrachloride Poisoning treated with Casein Digest and Methionine *Brit Med J* 1944 Feb 12 209-11 [12 refs] [Summary appears also in *Bulletin of Hygiene*]

A case of acute carbon tetrachloride poisoning following accidental ingestion of 30-40 cc was successfully treated with methionine The

v. 39 462] believes this is due to vaccination from the bacilli destroyed. Co-existent disease such as syphilis, tuberculosis, malaria and cardiac, hepatic or renal conditions must receive attention and appropriate treatment.

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WESLEY C Embolus of Left Femoral Artery due to a Hydatid Cyst *Med J Australia* 1943 Dec 11 v 2 No 24 483

THIAGARAJAH P R The Aetiology of the Anaemia of Ankylostomiasis In association with Malnutrition during Pregnancy Reprinted from *Trans Soc Med Officers of Health of Ceylon* 1942 Dec v 11 14 pp [37 refs]

In Ceylon the high death rates of mothers and children associated with pregnancy and childbirth as well as abortions premature births and associated illnesses are largely due to anaemia caused by hook worm and malarial infections chiefly the former [see WICKRAMASURIYA *Bulletin of Hygiene* 1939 v 14 665] In 1939 haemoglobin estimations were made in 1 119 women admitted to the De Soysa Lying in Home only 150 women had over 50 per cent The anaemia of these women is of the nutritional deficiency type with hypochromia and microcytosis in the author's opinion it is due partly to a deficiency of iron in the diet and partly to defective absorption of iron owing to damage to the intestinal mucosa by the worms [Other workers (*e.g.* NAPIER *et al* this *Bulletin* 1942 v 39 100 HILL & ANDREWS *ibid* 1943 v 40 324 HEILIG *ibid* 68) think that direct loss of blood with a deficient supply of iron in the food is the main cause of the anaemia of hookworm infection] The author emphasizes the need for iron therapy as a follow up after disinfestation by anthelmintics [In severe anaemia *e.g.* haemoglobin below 40 per cent some workers insist that iron should be given to increase the haemoglobin before anthelmintics are used and of course continued afterwards] J F Corson

MAHLINA P M [An Experiment on the Sanitation of a Focus of Ankylostomiasis] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 5 72-6 [In Russian]

The author reports on a village near Batum where the people are engaged in agriculture the sanitary practices are poor and hookworm and *Ascaris* infestation is considerable Treatment with santonin and carbon tetrachloride was given [doses not stated] and between the spring and autumn of 1939 the hookworm infestation rate was reduced from 48.4 to 6.3 per cent [Fulleborn's method] nevertheless 21.4 per cent of those treated remained infested Intensity of infestation was reduced from 4 700 to 410 eggs per gm of faeces [Stoll method] There was an average increase of 6.2 per cent in the haemoglobin of treated persons

The author concludes that systematic treatment does not give constant results without improvement of sanitation G Lapa, c

BEATTIE J HERBERT P H WECHTEL C & STEELE C W Studies on Hepatic Dysfunction I Carbon Tetrachloride Poisoning treated with Casein Digest and Methionine *Brit Med J* 1944 Feb 12 209-11 [12 refs] [Summary appears also in *Bulletin of Hygiene*]

A case of acute carbon tetrachloride poisoning following accidental ingestion of 30-40 cc was successfully treated with methionine The

patient a U.S. Army Air Force sergeant pilot aged 23 swallowed the carbon tetrachloride at 4.15 p.m. on Oct. 2, 1942, on an empty stomach having had no food since 7.15 a.m. He quickly became dizzy and light-headed but could walk with assistance. At 4.30 p.m. he was given salt and water and this caused vomiting at 5 p.m. He was put to bed and was given $1\frac{1}{2}$ grains of luminal. He refused food that evening and next morning. He was examined at 11 a.m. on Oct. 3rd by one of the authors who found the liver tender and enlarged to 2 in. below the costal margin. At 12.30 p.m. the patient was given by mouth and retained 2 gm. of *D,L* methionine. At 3.30 p.m. 1 cc. of a casein digest methionine solution was slowly injected intravenously and caused no immediate reaction. Five minutes later 5 cc. was injected also without reaction.

The infusion was prepared by dissolving 20 g. of a dried papain trypsin digest of casein in 600 ml. of distilled water. The solution was acidified and to it was added 15 g. of *D,L* methionine. It was then boiled and filtered. The final pH was 7.6 and the solution was approximately isotonic. It was tested by injecting 0.5 ml. into the ear vein of a rabbit. No effect was observed within a period of two hours.

Continuous intravenous infusion of the solution by a drip apparatus was begun immediately, the rate being about 2 cc. a minute. At 6 p.m. the edge of the liver was 2½–3 in. below the costal margin. At 6.30 p.m. when 4.36 cc. had been infused he complained of chilliness, intense headache and backache. His pulse was thin, his lip slightly cyanotic and his blood pressure was 130/20. Infusion was stopped, hot water bottles and blankets applied and 5 grains of an aspirin-codine mixture given. An hour later he was much better and his blood pressure was 120/88. At 7 p.m. he ate and retained a small meal.

Next morning, Oct. 4, he was mentally alert and took food well. The edge of the liver was only ½ in. below the costal margin. On the following morning, however, the dizziness and headache returned and his liver was 1 in. below the costal margin. Methionine was given by mouth 2 gm. at 9 a.m. and 2 gm. at 7 p.m. He took food well and felt better and by next day, Oct. 6th, he was apparently well but was kept under observation for another week. Soon afterwards he had resumed normal operational flights over enemy-occupied country.

Icterus was absent throughout the illness. The total amount of methionine given intravenously was 9.5 gm.

Rationale of methionine treatment was based on the observation of MILLER and WHIPPLE in 1942 (*J. Exper. Med.* 1942, 76, 471) that damage to the liver of animals from chloroform anaesthesia could be avoided if 3 gm. of methionine were injected within 3–4 hours.

Laboratory investigations indicating the mode of action of methionine included estimations of the nitrogen and sulphur balances and partition of the urinary sulphur between oxidized (total sulphate) and unoxidized (neutral) fractions.

The nitrogen balance showed a retention of 6 gm. over the whole period but a negative balance of 7 gm. on the second and third days, suggesting that on these days the processes of protein synthesis in the liver were impaired. There was a significant retention of sulphur and an excessive excretion of the unoxidized fraction during the first two days and during the relapse—60 per cent. of the amount given as methionine—whereas in the normal individual 90 per cent. is excreted as the oxidized fraction within 24 hours. The only other significant

abnormality was a rise in serum bilirubin when the liver was enlarging rapidly and the transient appearance of urobilinogen during the relapse

It is concluded therefore that no actual destruction of liver tissue took place but that the cause of liver disturbance induced by carbon tetrachloride is the abnormal metabolism of methionine and related compounds. The administration of methionine is considered to have prevented permanent liver damage

Ethel Browning

LEVIN I L [The Problem of Strongyloidosis] *Klinicheskaya Meditsina*
Moscow 1942 v 20 No 5-6 70-74 [In Russian]

This paper gives a general account of strongyloidosis due to infestation with *Strongyloides stercoralis* and an account of 12 cases seen by the author (cf SHIKHOBALOVA & SEMENOVA below). Some details of three cases are given.

The author points out that strongyloidosis is not a disease of tropical climates only—he regards it as a definite disease characterized by gastro intestinal symptoms and general intoxication.

The clinical picture is extraordinarily varied. Some cases show few or no signs of illness; others are severe and fatal. The onset may be acute simulating enterocolitis or gradual with debility, headache and gastro intestinal troubles persisting for several years with alternating improvement and deterioration. Among gastro intestinal symptoms are vomiting, heart burn, nausea, meteorism, salivation, giddiness, diarrhoea or alternating diarrhoea and constipation and jaundice in some cases. Some patients may undergo operation for appendicitis, gastric ulcer, etc.—this had happened in three of the author's cases. Meteorism was the most frequent complaint. He noted also a rise in the temperature sometimes to high levels. A temperature of 38-39°C [100.4-102.2°F] may be maintained for several days or there may be periods of subnormal temperature with intervals of higher temperature. No other cause for the high temperature could be found. The patient may have a characteristic muddy tint of the skin of the face. A rash may occur on the skin and may be localized over the abdomen. The blood may show signs of anaemia and eosinophilia of varying degrees. Treatment was not satisfactory. Carbon tetrachloride, male fern and thymol were tried; thymol was the best of these. After it patients reported improvement but it did not remove the larvae completely from the faeces although it reduced their number. Reference is made to treatment with gentian violet which apparently the author did not use (cf SHIKHOBALOVA & SEMENOVA below).

G Lapage

SHIKHOBALOVA N P & SEMENOVA N E [On the Problem of the Clinical Study and Treatment of Strongyloidosis] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 5 76-83 [In Russian]

After a brief history of the discovery that some cases of helminthiasis in man are due to *Strongyloides stercoralis* the authors note that the first cases in Russia were discovered in 1896 by SPASOKUKOTSKY. In 1922 SARIABIN and WAGNER collected four cases and themselves described five others. By 1924 Russian cases had been noted in Erivan, Azerbaijan, the Don Basin and Middle Asia and by 1937

others had been found in more northerly regions including Moscow and its surroundings where some of the patients had not left that district.

In this paper the authors give the results of their study of 29 cases from Moscow and the Moscow district between 1939 and 1941. 28 were adult (9 men and 19 women) and 1 was a girl aged 12. 21 were inhabitants of Moscow and district (7 had never left that region). Of the other seven 2 were from Kursk - from Middle Asia 2 from Yaroslavl (1 of these had come from Vladivostok and 1 from Kirovabad) and 1 from Dalnevostok.

Experiments showed that the climate of Moscow is favourable to the appearance of small foci of strongyloidosis.

A table shows the subjective symptoms and indicates that the most frequent of these were stomach pains, nausea, salivation, diarrhoea or constipation. Other symptoms were headache, dizziness and increased irritability. Patients were at the clinic 16-20 days and their faeces, blood and duodenal contents were examined.

The gastric juice of 10 patients was examined before treatment. The acidity was below normal in all except one in whom there was a total acidity of 45 and the free HCl was 15. A table gives the results. The gastric juice was not examined after treatment.

The blood examination showed eosinophilia in most of the patients; in some it was high. Table 2 shows that immediately after treatment the eosinophilia decreased considerably (e.g. from 25 to 0.5 per cent, from 25 to 7 per cent, from 14.5 to 3.5 per cent) but in some cases which reached 66.5 per cent this decrease did not occur (a few months after treatment it was still at 40.5 per cent). The haemoglobin values were about normal before and after treatment and the number of leucocytes was normal in most cases. In 10 patients examined during some months after treatment there was a steady decrease of the eosinophilia after treatment but in three this did not occur and there was even an increase.

Examination of the faeces for larvae was done on all patients. Fullborn's method was used and the authors also commend the Baermann method referring to GEFTER'S (*Med. Parasit. & Parasitic Dis.* 1942 No. 12 p. 60) work which showed that the Baermann method was better than microscopical examination of the duodenal contents. The authors think that duodenal contents should be obtained only from subjects who are still suspected of the disease after repeated negative examinations of the faeces. The cases were treated with gentian violet and crystal violet given in capsules in doses of 0.5 (they do not say whether they gave grammes or grains, presumably grains) for 8-16 days without interruption, the duration of the course depending on the intensity of the infection, the reactions of the patients and the effect on the parasites. In 11 men there was nausea and 5 vomited. The remainder tolerated the drug. No difference was noted between the tolerance and efficacy of gentian violet and crystal violet. Some patients had in addition to doses by the mouth, instillation of the drug into the duodenum. Fifteen of the patients were observed for not more than two months and 14 for 3 to 16 months after treatment. Table 4 shows the numbers of positive cases found during these periods of observation. The authors think that the result gave a rather false impression of the efficacy of the drug because in some cases larvae disappeared during treatment but reappeared in small numbers 1-2 months after treatment had ceased. They think that patients should

be observed for a longer time after treatment. Even 2-4 days after treatment began the number of larvae decreased considerably in some cases (e.g. Case No 5 had 141 larvae before treatment after two days treatment the number was 49 after four days 21 after five days 10 after six days 2 and after seven days 0 but after 16-17 days there were 1-3 larvae and they disappeared and reappeared during the next eight months). The symptoms showed striking improvement after treatment. The authors think that a serious study of strongyloidosis should be undertaken. It has been found among soldiers at the front where sanitary conditions may favour its occurrence. Soviet manufacturers are urged to produce enteric coated capsules of gentian violet.

ERNANDO P B & BALASINGHAM S. Acute Ascariasis in Children
Indian J Pediatrics 1943 Oct 10 No 40 149-73 [32 refs]

Pointing out that in countries where ascariasis is present infestation of children is frequent the authors say that ascariasis of children is not adequately described in text books. They have found in this *Bulletin* a wealth of records of experimental and laboratory work on *Ascaris* and many references to isolated cases of ascariasis in children but very few articles dealing with the subject as a whole. The present paper is intended to do this. It is based on 162 cases admitted to the Lady Ridgeway Hospital for Children at Colombo during 1938-9.

Ascariasis and ankylostomiasis are the two most important helminthiases in Ceylon. The Health Department conducts a campaign against them and in 1938 31 713 samples of faeces were examined microscopically. Of these 70 per cent had hookworms 60.6 per cent had roundworms [presumably *Ascaris*] 58.8 per cent whipworms [*Trichuris*] while only 1.7 per cent had threadworms [*Enterobius*] and 0.03 per cent tapeworms. [It is a pity that at least the correct generic names are not given in this and some other papers on the incidence of helminths.]

The authors conclude that two thirds of the general population of all ages harbour *Ascaris lumbricoides* especially in rural districts. About 10 per cent of patients attending out patient departments and dispensaries suffer from the effects of ascariasis and about 0.5 per cent of these latter need hospital treatment. Among in patients the case mortality of acute ascariasis is 8 per cent which is more than twice that of ankylostomiasis (3.3 per cent).

Analysis of the records of 3564 children admitted to the Lady Ridgeway Hospital at Colombo Ceylon during 1938-9 indicates that 162 (4.6 per cent) of these were admitted for acute ascariasis this disease being sixth in frequency in the list of diseases recorded and third among the causes of death (it caused 4.7 per cent of all the deaths being third only to pneumonia and acute diarrhoea with vomiting). Usually the younger the child the more severe the disease is. Most of the children admitted for acute symptoms were under five and the death rate among these was more than twice that among older children. About two thirds of the patients in the authors wards whose faeces were examined microscopically had evidence of *ascaris* infection but only a small percentage of these had symptoms of ascariasis. This indicates that one factor converts the infestation into a severe condition in some cases. The authors suggest that this factor is the

toxic effect of products liberated when the nematodes die in the intestine and they quote much experimental work [abstracted in this Bulletin] which indicates that the injection of *Ascaris* material can cause the symptoms of acute and chronic ascariasis.

The symptoms are very varied. Chronic ascariasis is described and its treatment with santonin or oil of chenopodium discussed.

The greater part of the paper deals with acute ascariasis. The authors very strongly deprecate the use of an anthelmintic during the acute stage when treatment should be symptomatic. Most (over 90 per cent) of the 162 patients seen were well nourished, many of the older children had a history of chronic ascariasis. Of cases without other diseases 27 per cent died. In 29 of the 162 cases (18 per cent) the acute symptoms had followed anthelmintic treatment, in others no exciting cause was found. Five clinical types are described. *Acute inflammation of the alimentary tract* occurred in 86 cases with 22 deaths. The onset was acute with very severe vomiting first of food and then of clear fluid and possibly worms (vomited by 58 patients); diarrhoea also occurred (34 cases) and dehydration, collapse, feeble pulse, a rise of temperature and sometimes tetany followed (in two cases). In these cases the disease resembled acute infective diarrhoea and the patients either died or recovered rapidly after two days. Blood and mucus in the stool may suggest dysentery. For the dehydration and severe circulatory depression 5 per cent glucose saline was given parenterally, vomiting was controlled by ipecac, lavage and adrenalin in 10 in a teaspoonful of iced water every hour for four or five doses. Calcium gluconate was given parenterally for tetany.

The toxic and cerebral type of the disease occurred in 15 cases. In eight it followed the use of an anthelmintic but was not due to the drug or to cerebral malaria. There were eight deaths and three others probably died at home. The onset is usually sudden and the dominating symptom is extreme restlessness, severe thirst, rapid rise of temperature, deep and rapid respirations occur and in a few hours there may be delirium, convulsions and semi-consciousness. Death may occur or recovery in 2-3 days. Encephalitis or meningitis may be simulated. The treatment of this type was symptomatic and was not satisfactory.

A third type of case shows *acute abdominal symptoms*. The authors had 34 cases of this kind with five deaths. Worms were palpable in 23, the condition followed the use of an anthelmintic in four only. The commonest signs are those of partial intestinal obstruction: an anthelmintic may expel some of the worms but more often it causes the partial obstruction to become complete. Other cases simulate acute appendicitis, this may subside spontaneously or peritonitis or intussusception may develop. In such cases the intestine contracts on the worms and in this connexion the authors refer to the work of Ross (this Bulletin 1921, v. 17, 90) showing that whole extracts of total *Ascaris* increase the tonus of the intestinal wall while extracts of its cuticle relax it. The authors were able to remove many of the worms by giving belladonna, atropine or hyoscine in full doses every 2-3 hours to relax the intestinal wall and liquid paraffin to lubricate the intestinal contents. Opium or morphia may be given to relieve severe pain. Olive oil enemata help to remove worms from the lower bowel. After this treatment has expelled worms an anthelmintic may kill and expel more. Obstructive symptoms were thus relieved in 21 of the 34 patients.

The respiratory type was seen in 12 cases there were no deaths It is due to larval infiltration of the lungs The onset is rapid with cough dyspnoea and rise of temperature recovery usually follows in 4-5 days Larvae were never found in the sputum and may not be found unless the infestation is massive Treatment included diaphoretics expectorants and oxygen In 14 cases these types were mixed and 10 of these patients died Complications due to the migration of the Ascarids occurred in only one case in which an Ascaris in the trachea of a child of 4 caused fatal asphyxia The hospital records during 1938-1941 showed four other cases the worms being found in the common bile duct the pleural and peritoneal cavities and under the capsule of and in the liver

In all cases the diagnosis was confirmed by finding Ascaris in the alimentary canal The authors state that no satisfactory cutaneous test is available for general use and that X ray examination may be useful but is hardly necessary

Discussing their results the authors refer to work on the haemolysis of mammalian red blood cells by extracts of Ascaris on the production of urticaria asthma etc by the injection of Ascaris extracts and on the antitryptic action of Ascarid extracts They quote records of severe intoxication or involvement of the nervous system in ascariasis which are they think striking features of the disease in children They occurred in 17 per cent of their cases and were responsible for 38.3 per cent of the deaths among these They discuss experimental work which suggests that in this type of case Ascaris toxins cause degeneration of the liver and suprarenal gland so that failure of these glands may be a factor Anaphylactic shock and allergy in ascariasis are also discussed

G Lapage

HAMANN C B Estimation of Histamine in the Blood and other Tissues of Rats and Guinea Pigs infected with *Trichinella spiralis* *J Parasitology* 1943 Dec v 29 No 6 367-72 2 figs [14 refs]

Little is known about the toxicology of trichiniasis One product of tissue destruction is believed to be histamine Because acute symptoms of trichiniasis appear at the height of tissue invasion and presumably of tissue destruction by *Trichinella* the author undertook a study of the histamine content of the blood and some other tissues (lung intestine kidney skeletal muscle liver) of albino rats and guinea pigs experimentally infested with *Trichinella* He concludes that there is an increase of histamine in the blood and possibly in some other tissues but that the results are difficult to evaluate because of the variability of both the experimental animals and the controls also we know little about the significance of slight changes in the histamine content of blood and the tissues nor do we know how quickly histamine may be excreted or destroyed

FLURY (1913 *Arch exp Path u Pharm* v 73 164) suggested that toxic effects of *Trichinella* are due not to a single substance but to a group of purine bases and creatine derivatives such as methyl guanidine HARWOOD P D SPINDLER L A CROSS S A and CUTLER J (1937 *Amer J Hyg* v 25 362) noted an increase of guanidine in rabbits experimentally infested with *Trichinella* but SOLLMAN T (1942 *Manual of Pharmacology* Saunders Philadelphia) doubted the significance of methyl guanidine

The author found that doses of 6 000 larvae per rat and 3 000 larvae per guinea pig gave satisfactory infestations. The fact that the symptoms were more uniform in guinea pigs supports the view of ROTH H. (1939 *Amer J Hyg* v 29(D) 89) that the guinea pig is the better animal of the two for experimental work on trichiniasis. The diaphragms of all the rats and guinea pigs were examined for the presence of *Trichinella* before histamine assays were done on them. These assays were done on rats 16-18 days and on guinea pig 23-26 days after the larvae were given to them. Assays on the blood were done by the method of CODE C F (1937 *J Physiology* v 89 25) which is a modification of the method of BARSOUM G S and GADDUM J H (1935 *Ibid* v 85 1). Assays on other tissues by the method of BEST C H and McHENRY E A (1930 *Ibid* v 70 349) as modified by ROSE B and BROWN J S L (1941 *Amer J Physiol* v 131 589). The whole blood method of ROSENTHAL S R (1937 *Amer Sur* 106 111) gave erratic results and was discontinued.

The histamine content of the blood of 20 control guinea pigs varied from amounts not detectable to 2.0 gamma/cc. of blood (mean 0.7 gamma/cc.) that of 21 experimentally infested guinea pigs varied from amounts not detectable to 4.0 gamma/cc. (mean 1.5 gamma/cc.) In 23 control rats the histamine content varied from amounts not detectable to 3.5 gamma/cc. (mean 0.5 gamma/cc.) while in 21 experimentally infested rats it varied from 0.04 to 5.0 gamma/cc (mean 1.4 gamma/cc.) In the liver kidney and skeletal muscle of rats and guinea pigs there was no significant difference between the histamine content of the controls and experimentally infested animals but the intestinal tissue of guinea pigs showed when marked duodenal inflammation was present (in only a few guinea pigs) values up to 8.0 gamma/gm (controls only 1.0 gamma/gm or less.) In lung tissue the mean values were infested rats 4 gamma/gm controls 3.3 gamma/gm infested guinea pig 4 gamma/gm controls 2.3 gamma/gm.

A slight eosinophilia was found in both infested rats and guinea pigs which was less consistent in the guinea pigs. There was no consistent correlation between this eosinophilia and the blood histamine values in either the rats or the guinea pig.

G Lapage

DEFICIENCY DISEASES

LEE D H A. Nutrition in the Tropics. Reprinted from *Australian J Sci* 1943 Aug v 6 No 1 6-9

In this short paper a number of statements are made which should be better appreciated by medical men and the general public alike. Some of the points are as follows.—There is no evidence that the consumption of quite large quantities of protein is deleterious in hot climates. Fat is not needed so much as in colder climates. The need for extra salt is now well known. The author advocates the following—

Weather	Acclimatization	Work	Added Salt Daily	
			Grams	Ozs
Hot dry	Unacclimatized	Heavy	14	0 5
		Moderate	7	0 25
	Acclimatized	Heavy	7	0 25
Hot wet	Unacclimatized	Moderate	—	—
		Heavy	7	0 25

If carbohydrate is increased it is essential to see that enough of the vitamin B complex is taken. Reduction of body water leads to constipation but this can be offset by increasing the roughage taken especially by increased consumption of vegetables and fruits. Alcohol should be taken very dilute. Boredom and isolation are adverse social factors and can be mitigated by variety and attractiveness in diet and in the circumstances of eating.

The food habits of the various races must be taken into consideration in planning food economy and it must take a considerable time before these can be overcome by educational effort. Local food production in Australia needs revision and the tendency to regard the country as a series of one crop areas should be avoided. Mixed production is essential and emphasis is laid on the cultivation of vegetables and of the fruits which can be grown in such profusion. Distribution and storage of foods and the provision of fast refrigerated transport are matters of moment.

Education of the general population in the principles of good diet must be pressed and the most telling campaigns will be those conducted through schools and baby clinics. Planned settlement of the country is imperative. Undoubtedly monetary interests will come into conflict with such planned settlement but until biological necessities gain precedence in our social system over sectional economic interests reconstruction will be very incomplete.

Charles Wilcocks

LE RICHE H. *A Health Survey of 3,510 African School Children in Alexandra Township* 16 pp 10 figs [13 refs] 1943 Johannesburg Witwatersrand University Press [Summary appears also in *Bulletin of Hygiene*]

Alexandra Township is in an area in the Transvaal Province 9 miles from Johannesburg where Africans have a right to purchase land on freehold tenure. There are so few of these areas that there is keen competition for the small plots of land and consequently they command high prices. This coupled with the low incomes of the people has made it difficult for them to pay for their land and houses which are heavily mortgaged. In order to increase their income the owners have erected blocks of rooms on their properties which are let to poorer families and this has resulted in considerable overcrowding. The health survey described in this paper consisted of a clinical examination of 3 510 African children aged 6 to 16 years attending four schools in the township. It is pointed out however that since attendance at school is not compulsory children who do attend school tend to come from better homes than those who do not.

The tests applied in the clinical examination are illustrated by some rather novel pictures. It was concluded that about one quarter of

the children were deficient in musculature and sub skin tissue and it is thought that this was due to chronic food lack. A few complained of tenderness of the muscles of the extremities which may or may not have been due to scurvy. The posture of 53 per cent of them was considered to be satisfactory. 11 per cent had knock knee but only 0.3 per cent showed enlarged wrists and there were 10 cases of beading of the ribs. Skin lesions due to dietary deficiency appeared to be very common—36 per cent of the children were suffering from phrynoderma and 43 per cent of them from Mosaic but the co-existence of syphilis was thought to be a complicating factor. Out of 496 Wassermann tests taken at one school 64 (12.9 per cent) were positive. Ears nose lips and mouth were also examined. Only 0.6 per cent were suffering from Bitot's spots thought to be due to a vitamin A deficiency. 15.4 per cent showed signs of cheilosis and 2.8 per cent angular stomatitis both considered to be caused by a deficiency of riboflavin. 31 per cent had slight dental caries and 11.7 per cent severe caries. 12.8 per cent had spongy bleeding gums but it is suggested that this may have been due to faulty dental hygiene or secondary syphilis and not necessarily to scurvy.

There was a very high incidence of enlarged glands. 73.4 per cent had enlarged glands of the neck. Slightly enlarged thyroids were found in 1.8 per cent of the children. Chests lungs hearts and abdomens were also examined. The final classification of the children was made into three groups. In 39.6 per cent of them no abnormality was detected. 50.6 per cent required nursing or medical supervision and 9.8 per cent were obviously ill and required hospitalization.

It is recommended that all children in the township shall receive periodical medical examinations that a part time dentist and a school nurse are required and that school feeding should be instituted forthwith.

E. M. Widdowson

KARK, S. L. Adult and Infant Pellagra in South African Bantu. A Comparative Clinical Study. *South African J. Med. Sci.* 1943 July, v. 8, No. 2-3, 106-114. [45 refs.]

In this *Bulletin* [1936, v. 33, 729-815, 885] all the records relating to pellagra were summarized to that date including infantile pellagra.

The author gives a list of these records and most usefully brings the series up to July 1943.

He then considers 96 cases coming under his own observation. 62 of the disease in adults, 34 in infants and young children. Fifty-three cases were seen in Johannesburg, 43 in rural areas of Polela and Impendle, Natal.

All those who have been interested in the disease as seen in young children in Africa will read this article with advantage.

To Dr. Kark was given the opportunity of studying the disease in the adult and in the infant side by side, an opportunity denied to those who first wrote concerning the infantile type in East and West Africa and failed to recognize the pellagrous nature of the affection.

In discussing his cases the author points out the likeness of all essential symptoms in the two age groups, any differences being due to the acuteness of the disease in infants.

[His findings confirm therefore the view always held by the reviewer.]

H. S. Stannus

- 1 HUA T J & CHENG S Y Preliminary Report of Pellagra Outbreak in Kowloon *Caduceus* Hong Kong 1941 Feb v 20 No 1 1-12 2 graphs & 15 figs on 10 pls
- 11 WILKINSON P B & AU KING Retrobulbar Neuritis due to an Avitaminosis *Ibid* 13-21 3 folding pls

Pellagra was considered a comparatively uncommon disease before the war. Now however the affection is becoming a matter of some importance among the refugee population.

1 In the last three quarters of 1940 185 males mostly between 30 and 50 years of age and 235 females between 40 and 50 came under observation of whom 137 died (32.6 per cent.)

The authors classify their cases as (1) those with dermatitis (2) those with dermatitis and diarrhoea (3) those with dermatitis diarrhoea and marked prostration (4) those with marked mental symptoms.

The symptoms in great part common to all were—burning tingling and numbness of the skin typical dermatitis chiefly on exposed surfaces and pressure points with bullous formations in many blepharitis stomatitis angular stomatitis glossitis dysphagia. Meningism was present in some and what the authors refer to as beriberi symptoms in 56 per cent. The eyes were not examined.

[In one place the authors say while deficiency of vitamin B₃ as a cause of pellagra may be considered proved. This is not very clear but presumably the reference is to nicotinic acid.]

11 In six months the authors have met 15 cases of a condition diagnosed as retrobulbar neuritis among refugees believed to be suffering from pellagra with symptoms described as sore tongue giddiness palpitation acroparaesthesiae weakness in the limbs etc. in one oedema of eyelids noted in one scrotal eczema in two perleche (*sic*) in one the canthi were affected one had a pellagrous rash.

In 11 of the 15 cases (11 males and 4 females) the fundus was normal 4 showed some degree of optic atrophy with temporal pallor of the discs one complained of photophobia but only on being asked all except two exhibited a sluggish pupillary reaction to light and poor maintenance of contraction. Examination of the fields showed concentric or quadrant contraction in all except two but the authors were unable to demonstrate central or paracentral scotoma for white red or green.

Patients were stated to have no neurological symptoms.

Regarding treatment—nicotinic acid 100 mgm per day for one week is said to have caused much improvement in visual acuity. One drachm of yeast thrice daily brought about cure. To a single patient 1 mgm riboflavin thrice daily was given vision was restored from 6/36 to 6/6 in each eye in 10 days. To a second patient given 3 mgm riboflavin daily for 2 weeks without improvement thiamin (Betaxin) 3 mgm by injection was added but without effect during the fourth week 50 mgm nicotinic acid twice daily were administered with improvement.

[These cases obviously belong as the authors suggest to the group now probably well known to which also belonged those described by Fitzgerald MOORE (this *Bulletin* 1934 v 31 820 1938 v 35 72) and LANDOR and PALLISTER (see *Bulletin of Hygiene* 1935 v 10 733). They all respond to yeast but unfortunately no one has yet

MISCELLANEOUS

AKHARTOU M. The Khitchener School of Medicine. Seventh Report 1939-1942. SS pp. 4 pls

Since 1924 the School has admitted 138 students and has passed out 82 graduate who are licensed to practise medicine in the Sudan. Normally after a medical course lasting six years successful candidates having passed the final examination are required to spend two years as residents in certain hospitals. At the end of this period if reports show them to be fit to carry on medical duties without supervision they are accepted to the rank of Sudanese Medical Officer of the Sudan Medical Service. Post graduate classes are organized locally but graduate selected to fill senior posts are sent to London for post graduate study.

In the reports here presented for the year 1939-42 a very comprehensive account is given of the syllabus and of the activities of the student. It is evident that much thought has been given to the question of what is to be taught and that the training is very comprehensive. It is therefore important to know to what extent that training succeed in producing efficient doctors and on this point the comments of visiting examiners are illuminating. [It should be understood that all examinations are conducted by external examiners and that the final examinations are under the supervision of a Visitor appointed by the Royal Colleges of Physicians and Surgeons.] For 1939 the Visitor was Sir Adolphe ABRAHAM and his report is almost entirely favourable. For 1940 permission had been obtained from the Royal Colleges to proceed without a Visitor but the services of Lt-Col F. N. FOSTER and Lt-Col E. G. OASTLER were secured. Their brief report also was very favourable. For 1941 Col J. S. K. BOYD and Col A. E. RICHMOND presented reports which expressed opinion of the candidates much less favourable than those of the previous year. For 1942 the Visitor Maj-Gen W. H. OGILVIE made the satisfactory comment that the clinical part of the final examination was better done than the papers an opinion directly contrary to those of his predecessors.

Comments were made on accommodation, organization and teaching material. It is evident that the shortage of post mortem work which is difficult because of the religious customs of the people is a serious handicap.

The chief criticism of the students was that they appeared to have learned their subject rather from books and lectures than from their own observations and investigations and that they were less at ease when confronted by a patient than when asked a question which could be answered from recollection of what had been taught. [Maj-Gen Ogilvie did not subscribe to this opinion.] Col Richmond remarked however that his criticism related to the students he examined and that they were probably not so highly intelligent as men from previous classes whom he had met at work in the Sudan.

[It would be surprising if these students did not show some tendency towards undue respect for the written word or the authority of teachers. The Moslem way of life inculcates something of that frame of mind and the respect paid by literate Mohammedans to the Koran must be instilled into children from an early age. To change from unquestioning acceptance to an attitude of critical evaluation depends not only upon the teaching given at a medical school but also upon the

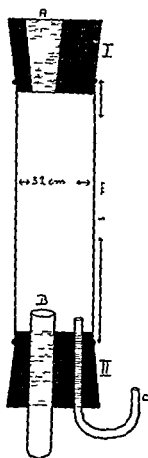
attitude of the teachers in the primary schools and perhaps most important upon the atmosphere of the home in which infancy and early childhood are spent. It may well be that one or more generations will be needed before an undergraduate in the Sudan enters upon his medical course in a critical frame of mind.]

There seems to be little doubt that the spirit of the school is happy and that the teachers and the Dean are enthusiasts but emphasis is laid in the reports on the need to improve the pre medical education in all branches of general culture. [The report is a heartening indication that the Government is training Africans to take responsibility for the welfare of their own people.]

Charles Wilcocks

PLUM C M A Method for collecting Large Samples of Blood from Living Rats *Acta Physiol Scandinavica* 1943 v 6 No 4 289-90
1 fig

With the simple apparatus shown in the figure 1 or 2 cc of blood may be taken from the tail of a rat and this repeated at short intervals. The hole (A) in the rubber stopper has a diameter of 1.6 cm at the outer



Apparatus for taking blood samples from tail of living rat
[Reproduced from *Acta Physiologica Scandinavica*]

end and 1 cm at the inner end. The test tube (B) is 1 cm in diameter the tube (C) is connected to a vacuum pump.

The rat's tail well smeared with vaseline is passed through hole (A) and suction is applied for about two minutes the rubber stopper (II) is removed and the end of the tail snipped off the end of the tail put into tube (B) and suction again applied. In 2-3 minutes 1-2 cc will have collected in the test tube since rat's blood readily coagulates it is well to have a little dry anticoagulant in the test tube. If the collection of blood has to be repeated at short interval the tail is dressed in the meantime with collodion on cotton wool. J F Corson

BALL G H Parasitism and Evolution Reprinted from *Amer Naturalist* 1943 July-Aug v 77 345-64 [74 refs]

Many parasitologists have accepted without question the dictum that length of association of a parasite with a particular host leads to a condition of non pathogenicity and *vice versa* a parasite which is highly pathogenic to a host is one which has only recently adopted this host. In his presidential address before the Western Society of Naturalists Stanford University the author questions this generalization and illustrates his remarks by reference to a number of instances amongst the protozoa and helminths in which the reverse appears to be the case. He concludes by stating that as biologists we may all agree on one aspect of nature namely its exceeding variety. Even a parasite may choose the course of manifest destiny and find aggressiveness more attractive and more valuable than an existence of peace and symbiosis. C M Wenyon

1 VAIDYA S K Observations on Tropical Eosinophilia *Indian Physician* 1943 Oct v 2 No 10 358-65

11 WEINGARTEN R J Tropical Eosinophilia [Correspondence] *Ibid* 369-72

1 Vaidya inveighs against the synonym eosinophilic lung for this condition and tropical eosinophilia though less committal has not yet been proved very appropriate the author appears to view it as asthma. The patients were seen by him in Bombay. [He repeatedly uses the term disease entity without defining it and strictly interpreted the term has no meaning a disease entity as Clifford ALLBUTT long ago pointed out is non-existent] Very instructive cases are quoted in which the total leucocytes might be over 60 000 per cmm with eosinophiles 75.6 per cent at another time the same patient had a count of 56 600 and an eosinophilia of 87 per cent. The response to neosalvarsan injected intravenously at weekly intervals in doses of 0.3-0.45 gm was very satisfactory. Relapse may occur three or more years later the interval being free from attacks but response again follows administration of neosalvarsan.

11 Weingarten stresses the differences between tropical eosinophilia and asthmoid bronchitis and Loeffler's syndrome stating that in asthmoid bronchitis there is not a leucocytosis and only moderate eosinophilia without pulmonary infiltration and in Loeffler's syndrome the clinical and radiological signs disappear rapidly and spontaneously. [Differences from ordinary spasmodic asthma will be obvious when one reads that a course of six injections at weekly intervals establishes a practical cure and that free intervals are as long as 3½ years or more. See this *Bulletin* 1941 v 38 538-539 1943 v 40 707-1948 and *Bulletin of Hygiene* 1936 v 11 296] H Harold Scott

ALWALL N Ein Beitrag zur Frage der Pathogenese Ätiologie und Therapie der eosinophilen Lungeninfiltrate [Contribution to the Question of the Aetiology Pathogeny and Treatment of Pulmonary Infiltration with Eosinophilia] *Schweiz med Woch* 1943 Nov 27 v 73 No 48 1438-40 2 figs

The author gives brief notes of four cases of what is known as Loeffler's syndrome—pulmonary infiltration with eosinophilia. The first patient was a woman of 47 years who gave a history of bronchitis for five years past and between 1939 and 1941 had repeated attacks of asthmatic bronchitis. In November 1942 she had transient lung infiltration with eosinophilia 28 per cent. In January 1943 she had a return of the pulmonary condition with slight rise of temperature and an eosinophilia of 47 per cent. Expectoration was scanty and colourless but *Pneumococcus* Type 31 was isolated from it on two occasions and she was given sulphathiazole from January 26th to February 6th with good effect. At the end of February and again in March she had a return of the lung condition the last time with Type 33 *Pneumococcus*. During her illness she also had complained of pain in the joints.

The second patient was a woman of 36 years who had suffered much from cough for 14 years and since 1937 with shortness of breath with the cough. During 1940 she was in bed for some months with fever and for a time was in hospital. Transient pulmonary infiltration was found with eosinophiles ranging between 7 and 47 per cent. In February 1943 she was again confined to bed with subfebrile temperature pulmonary infiltration eosinophilia 20-32 per cent and in her sputum *Pneumococcus* Type 7 was found. She had had relapses intermittently for three years.

The third was a woman of 47 years with chronic otitis since the age of five years bronchitis of an asthmatic type for the past ten years and attacks of pulmonary infiltration with eosinophiles to 10 per cent. During the preceding 18 months she had had articular rheumatism which cleared up when the lung conditions appeared.

The fourth patient was a woman of 41 who had had repeated attacks of asthma since 1937 and in the autumn of 1942 pulmonary infiltration of the Loeffler type with eosinophiles up to 35 per cent. For ten years she had complained of rheumatic pains in her joints. These have never left her altogether but were always slightest when the asthma was at its worst.

Collating and comparing the four cases we see that pneumococci were found in two and benefit followed treatment with sulphathiazole that three suffered from articular rheumatism an allergic manifestation says the author not previously stressed as present in Loeffler's disease and that relapses occur in this condition. Examination for *Pneumococci* must not be omitted in refractory cases as the benefits from chemotherapy (sulphathiazole) or from specific serum therapy [which however is not mentioned in any of the four cases] are great.

H Harold Scott

EMERSON K Jr Tropical Eosinophilia *U S Nav Med Bull* 1944 Jan v 42 No 1 118-23 1 chart

The author describes the case of a man aged 30 years who presented all the characteristic signs and symptoms of what has been named tropical eosinophilia by WEINGARTEN and as Loeffler's syndrome or

eosinophilic lung" by others [though Weingarten distinguishes the first named from the others mainly by the fact that the clinical and radiological signs in Loeffler's syndrome disappear rapidly and spontaneously whereas tropical eosinophilia may persist for a long time unless appropriate treatment by arsenicals such as neosalvarsan is undertaken]

The patient in question had suffered from asthmatic attacks in 1936-37 and then went to India where he worked for $4\frac{1}{2}$ years in excellent health except for attacks of diarrhoea. In 1942 he was passed fit for a Commission in the Naval Reserve. Four months later he had a return of his attacks of asthma this time accompanied by increasing fatigue and loss of weight. For nearly two months he had fever and at the end of February 1943 he was operated upon for hepatic abscess. About three weeks later the leucocytosis which had fallen after his operation increased to reach 32 500 per cmm 78 per cent of which were eosinophiles but there was no fever. Asthmatic attacks with moist rales and rhonchi continued and by X rays a diffuse faint mottling was seen. Treatment on the usual lines for asthma brought very little relief until the suggestion was made that the case might be one of tropical eosinophilia. Carbarsone 0.25 gm twice daily was given for ten days and a second course after an interval of ten days. By that time the leucocyte count was normal and the eosinophile percentage was 9. The cough disappeared and the physical signs in the chest cleared up.

[This peculiar condition has repeatedly been referred to in this Bulletin the leucocytosis may reach higher values than that of the case here reported 60 000 or more and eosinophiles 87 per cent. It is known also that relapses may occur after intervals of three years and even longer and if the condition is found to occur in places other than India (in Bombay especially) the state recorded in 1942 in this patient may have been the same as that in 1936-37. There is much yet to be learned concerning the so called Tropical Eosinophilia. See this Bulletin 1941 v 38 538-539 1943 v 40 720 721 948.]

H Harold Scott

CHAKRA ARTY U N & ROY S C A Case of Tropical Eosinophilia
India Med G 1943 Dec 78 No 12 596-7

SHAH R L A Case of Pseudo Tuberculosis of the Lungs with Eosinophilia
Ind Med G 1943 Dec 78 No 12 597

STEIN H B & MILLER E Onyala and Acute Thrombocytopenic
Purpura Clin Proc Cape Town 1943 Oct v 2 No 10
347-54

In this informative paper the authors review the similarities and hence the possible relationship between onyala and thrombocytopenic purpura. In an instructive table they set out the similarities and differences the similarities are many and the differences few namely the geographical limitation of the former to Africa the age and sex incidence (onyala affecting mostly adult males the latter children and young adults and females more than males) and lastly the fact that the former is usually an acute condition the latter chronic but no hard and fast distinction is possible as regards the last. Clinically haemorrhagic bullae are a characteristic feature of onyala but they have not been described in thrombocytopenic purpura.

The authors then record in detail the case of a European woman of 39 years exhibiting purpura associated with nephrosis she had also had deep X ray therapy but whether this played a part in producing the purpura is not known Four months later she had haemorrhage from the nose and mouth and there were two haemorrhagic bullae on the right cheek and three smaller ones on the tongue with purpuric spots on legs and arms This sequence and the coexistence of purpura and bullae on the second admission to hospital are strong evidence that there is a close connexion between the two diseases they may even not be two but only one may be an aggravated form of acute idiopathic purpura [See also GILBERT below] H Harold Scott

GILBERT B Onyala a Tropical Condition characterized by Haemorrhages Its Gynaecological Aspects *J Obstet & Gynaecol Brit Empire* 1943 Dec 1 50 No 6 437-9

The author gives a good description of the main features of onyala and mentions that it belongs to the purpura group and is essential an acute thrombocytopenia He states that its existence outside Africa is very doubtful though he acknowledges in his summary that it possibly occurs in Central and South America Cases recorded as thrombocytopenic purpura with symptoms resembling those of onyala have been reported in New Orleans In text books bleeding from the genital tract is not mentioned and when it occurs it is liable to be mistaken for menorrhagia The author records a case occurring in late pregnancy in a multipara the disease did not interfere with or complicate labour [See this *Bulletin* 1939 1 35 74 444 (in the last case with vaginal bleeding is mentioned) 1939 1 36 157 158 938 1940 1 37 673] H Harold Scott

GRACE A W Tropical Lymphangitis and Abscesses *J Amer Med Ass* 1943 Oct 23 123 No 9 462-6 1 chart

In 1926-28 Dr Grace was engaged on a special mission of investigation in British Guiana into filariasis lymphangitis and abscess formation The results of this were published in a Memoir of the London School of Hygiene and Tropical Medicine [reviewed in this *Bulletin* 1932 1 29 73] The present article is based on and arises out of the author's previous studies By tropical lymphangitis he implies cases in which no local lesion or other apparent cause can be found to account for the lymphangitis It usually comes on suddenly and in 80 per cent of cases affects the lower limb the arm breast and scrotum in this order accounting for the remainder The age group most attacked are those in the second decade and four fifths are below 30 years of age The symptoms are usually severe deep seated pain at first localized later spreading followed by an extending erythema with streaks to the adjacent glands and oedema with fever to 103 F and considerable prostration temperature begins to fall in 24 hours though severe attacks persist for longer and the symptoms abate and pass off in 2-3 days there is no desquamation There may rarely be only one attack but more often there are recurrences and the remissions range between wide limits from days to years Hard tender nodules 2 by 2 by 0.5 cm may be felt in the deeper tissues most of these subside but some progress to abscess formation and from this beta haemolytic streptococcus may be obtained usually in pure culture

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The author next describes the characters of the growth the fermentation and serological reactions virulence etc. of the organism based on 68 strains isolated in British Guiana. He found certain differences mainly of degree between the streptococcus isolated by him and that common in temperate climates.

The author then discusses the relation of *Haemophilus bancrofti* to this lymphangitis and yet the condition cannot be ascribed to the streptococcus alone as the differences from the temperate climate organism do not warrant such a conclusion. The lymph stasis due to the worm seems to render the tissues more sensitive to the streptococcus and its products and attacks of lymphangitis may be occasioned organismal or toxic stimuli of intensity too low to be appreciated.

Dr Grace also tried to ascertain in what way the presence of *H. bancrofti* renders the tissues more susceptible by testing 52 patients as to their skin reactions to scarlet fever and British Guiana strains of streptococcus and by studying the blood taken at night from 300 persons with abscesses of known bacterial nature but unsuccessfully. No relationship could be proved between the presence of filarial embryos in the blood and reaction to the streptococcus or its toxin [see also this Bulletin 1933 30—8].

H Harold Scott

HEILIG R & PUTTAYIA Virle Coliform Group Infections of the
Urinary Tract their Clinical Types and Incidence in Mysore
Indian Med Ga 1943 Jan 78 No 1 11-18 [15 refs]

In some cases entered as of pyrexia of uncertain [not unknown] origin the authors conclude that the cause is infection of the urinary tract by organisms of the coli group. They made this diagnosis only when all the other ascertainable causes could be excluded. They examined in 11 months a total of 1810 patients 1246 males and 564 females 45 per cent of the former and 243 per cent of the latter had such an infection. About three fourths showed febrile illness but the type of fever was not characteristic more commonly it was low and irregularly continued high or septic intermittent. The leucocyte count rarely exceeded the normal and the blood sedimentation rate was of no help. The most satisfactory form of treatment was by intravenous injection of 20-30 grains of hexamine. Only in the event of this failing did they resort to sulphonamides such as sulphapyridine. In some cases both were needed before the condition cleared up. The prognosis on the whole is good. Three of the female patients died none of the males. Five other deaths occurred among the women but in addition to the bacilluria they had been suffering from chronic diarrhoea and were moribund on admission.

H Harold Scott

BAGCHI K N & GANGULI H D Toxicology of Young Shoots of
Common Bamboos (*Bambusa arundinacea* Willd.) *Indian Med Ga* 1943 Jan 78 No 1 40-49

Young shoots of *Bambusa arundinacea* the common bamboo are used in pickles or as curry in India. Cattle are fond of them also and the owners protect the shoots at the time of the rains when the sprouting begins. Fatal results may follow their consumption. *Sorghum vulgare* belongs to the same Natural Order Gramineae and as the latter is

known to be cyanogenetic (i.e. contains a glucoside which under certain conditions liberates HCN) the authors examined the bamboo shoots to see if they also were cyanogenetic

They found HCN present the amounts in the tips being considerable Thus of the commonest species of bamboo in Bengal near the base the amount was 0.098 per cent at the tip 0.8 per cent The enzymic hydrolysis of the glucoside is hindered by acids or alkalis and cooking also prevents hydrolysis by destroying the enzymes in other words the human stomach does not afford the best conditions for such hydrolysis hence cases of human poisoning are rare The pickled shoots however are not boiled and the equivalent of 1 grain of anhydrous HCN—the minimum fatal dose for man—may be obtained from a quarter of an ounce of the uncooked shoots *H. Harold Scott*

GERMER W. D. & BLIHRENS H. Ein Beitrag zur Stechmückenfrage von Gran Canaria [A Contribution to the Mosquito Question of Grand Canary] *Ztschr. f. Parasitenl.* 1942 v. 12 Pt 6 645-58 [Summary taken from *Rev. Applied Entom.* Ser. B 1943 Dec v. 31 Pt 12 235-6]

Except for some cases of malaria in the south of the island (the only district in which Anophelines occur) Grand Canary is free from endemic mosquito borne disease There were three epidemics of yellow fever in the 19th century but it has not been recorded since in spite of considerable traffic with the endemic regions of West Africa and South America a favourable climate and a high index of *Aedes aegypti* L. (*Stegomyia fasciata* F.) which is represented by var. *canariensis* Pittaluga The other Culicines comprise five species of *Culex* and *Theobaldia longiareolata* Macq. *A. aegypti* constituted 20-30 per cent of the mosquitos found in houses in the urban district of Las Palmas but it was not taken at altitudes above about 1150 ft The peak of mosquito abundance and the highest average temperature (27-28 C [80.6-82.4 F]) occur in September but mosquitos are numerous in other months and even in winter with an average temperature of 17 C [62.6 F] the percentage of *A. aegypti* is not markedly different The egg larval and pupal stages lasted 1-2, 12-15 and 2-4 days at 20 C [68 F] the adults lived for 14-18 days and eggs were laid two days after a blood meal When reared in water containing urine ammonia sodium chloride sea water grape sugar hydrochloric acid sulphuric acid nitric acid or potassium hydroxide the larvae were able to develop in much higher concentrations than could those of *C. pipiens* L. or *T. longiareolata* Their control is difficult because water is stored in quantity the rainfall averaging only 4 ins a year There are 1640 large open tanks in the urban district of Las Palmas alone besides those in houses Goldfish and guppy fish [*Lebistes reticulatus*] were placed in tanks that were suitable and the keeping of ducks was advised A mixture of equal parts of kerosene and Diesel oil proved effective for oiling at the rate of 0.6 fl. oz. per sq. yd.

FAIRCHILD G. B. An Annotated List of the Blood sucking Insects Ticks and Mites known from Panama *Amer. J. Trop. Med.* 1943 Nov. v. 23 No 6 569-91 [84 refs.]

The fauna of the Panama area is exceedingly rich and many men have worked there and collected over a long period of years The

author feels that the present list will be useful as a summary of what is known and which may be required by medical entomologists and others now working in this part of the world

The list is drawn up in a comprehensive way and includes many bloodsucking insects which are not known to attack man or common domestic animals. It includes ticks and parasitic mites as well as insects which suck blood or cause myiasis. The author has concluded that it is not for him to make a list of the mosquitoes of the area a decision which may be wise but which will certainly be regretted by those who use his paper. A full list of references is included.

P A Burton

PENBERTON C E Entomology Rep Comm Exper Station Hawaii
Su Pl Ass 1941-42 1943 18-22 [Summary taken from Re
Applied Entom Ser B 1943 Dec v 31 Pt 12 247]

Aircraft quarantine work was continued in Hawaii during 1941-42 in co-operation with the military and naval authorities but was discontinued at Midway and Canton Islands in December 1941. The aircraft are sprayed before they are inspected and most of the insects found were dead but they included some serious pests and one live mosquito of the genus *Anopheles* in an aeroplane from California. R H Van Zwaluwenburg found that the application of copper sulphate at $1\frac{1}{2}$ oz per 50 cu ft water inhibited mosquito development for at least $2\frac{1}{2}$ months in water stored for fire protection and in co-operation with T N humura that Vatsol (a sulphonated ester of boric acid) or 2.7 R (a sulphonated naphthalene) applied at the rate of 2 cc of a 5 per cent solution per 1000 cu ft water did so for about six weeks and several months respectively. He also found that *Baeus californicus* Pierce the egg parasite introduced from California for the control of *Latrodectus mactans* F was established on Maui in November 1941 over a year after it had been liberated there.

SUTTON R L Jr Trombidiosis (Chigger Bites) Relief of Itching
with Ethyl Aminobenzoate in Flexible Collodion J Amer Med
Ass 1942 Sept 5 v 120 No 1 26-7

The author recommends the following local application to relieve the itching caused by chigger bites: ethyl aminobenzoate 2 gm or cc flexible collodion 15 gm or cc. This relieves itching for 4 to 8 hours. [The author applies the term chigger to the harvest mite this should not be confused with the flea *Tun a penetrans* to which the name chigger or jigger is applied in Africa.]

J F Corson

TROPICAL DISEASES BULLETIN

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THE GEOGRAPHICAL DISTRIBUTION OF MITE BORNE TYPHUS FEVER

[TSUTSUGAMUSHI DISEASE JAPANESE RIVER FEVER SCrub TYPHUS
MITE FEVER]

By J F COPSON OBE MD DPH DTM & H

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and

Charles WILCOCKS MD MRCP DTM & H

Acting Director Bureau of Hygiene and Tropical Diseases

[The name mite borne typhus is applied in this study to the rickettsial disease which has been known by the names quoted in the heading of this paper and other names. The researches of LEWTHWAITE and SAVOOR (1940) indicate that there are no essential differences between the diseases to which these names have been applied and that finding has been accepted by the Bureau of Hygiene and Tropical Diseases. MEGAW'S view (ROGERS & MEGAW *Tropical Medicine* 1942 p 176) that this disease should be included in the typhus group on grounds of aetiology is also accepted. It seems unnecessary to create a division in the rickettsial diseases when the aetiological agents are so much alike and the modes of transmission so similar.]

Mite borne typhus fever is known to occur in the following countries Japan Formosa and the Pescadores Islands Borneo New Guinea Queensland Java Sumatra Malaya French Indo-China Burma India and Ceylon. Various authors have stated that it occurs (or probably occurs) in Korea Shanghai and other places in China and in the Philippine Islands but the opinions appear to have little evidence to support them.

As the name tropical typhus has been used to include both murine typhus and mite borne typhus the diagnosis is doubtful where agglutination tests have not been made.

With regard to arthropod vectors the fact that they have been found on an animal does not necessarily mean that they are ectoparasites of that animal. Their presence might be accidental and temporary.

Japan

The disease appears to be limited to areas near the banks of certain rivers on the west side of the main island (Honshu Hondo or Nippon) it is endemic in the Nagata province in this island. The following areas are mentioned —

Akita province—rivers Omono Minase Nishimanai Masuda and Inaba
Yama province—river Mogami
Nugata province—rivers Shinano and Aka

Districts of certain rivers —

Uonuma river—Minami Uonuma district
Shinano river—Koshi Santo Minami Kambara Nishi Kambara
Naka Kambara
Aka river—Kita Kambara

The disease is transmitted by *Trombicula akamushi* which infests the field vole *Microtus montebellii* other rodents and some birds

Formosa

The population is 5 700 000. The island is divided into five prefectures and three Districts. In the western part of the island there are five prefectural governments viz. in Taihoku Shinchiku Taichu Tainan and Takao the eastern part is sparsely populated and is divided into two districts Taito and Iarenko. The Pescadore (Boko) Islands form another district.

In the main island the disease is very widely distributed (contrary to what occurs in Japan) being found in all five prefectures and two districts. It is found not only near river banks but also in cultivated fields foot hills jungles in the plains and in the mountains which rise to a height of 6 500 feet. It is however mostly seen in valleys and foot hills. It is most prevalent in the eastern part of the island (Iarenko and Taito) is fairly prevalent in the plains and foot hills of Takao prefecture in the south and occurs also in the central mountains in Tainan Taichu and Shinchiku and in the river basin of Taihoku prefecture.

While in Japan the disease is limited to the period May to October it occurs all the year round in Formosa but is most prevalent from May to December the peak period being from July to October.

It is transmitted in Formosa by *Trombicula akamushi*. The larvae are found on *Rattus rattus rattus* *R. rattus rufescens* *R. norvegicus* *R. losea* *R. coxingi* *Apodemus semotus* *A. rarius* *Mus musculus* and *Mus formosanus* also on *Crocidura murina* (the shrew) and on the domestic buffalo and some birds—foal pheasant *Turnix taigour* (button quail) and *Centropus javanicus* (crow pheasant). In the endemic area *R. losea* and *A. agrarius* are commonest and are heavily infested. A strain of rickettsia was isolated by the author of the paper in which this information is given (Kaoru MORISHITA) from *R. losea* captured in the endemic area.

In 1935-1938 there were 18 26 16 and 20 cases with 0 2 4 and 6 deaths respectively.

The following localities are mentioned by Jura HATORI (1919) —

- (a) Kurenko district
 - (1) Mokkai and Rokai valley
 - (2) Yoshino plantation
 - (3) Kotobukimura and western Tayoda plantation
 - (4) Hayashida plantation Horin Sho and neighbouring forests
 - (5) Marubashi plantation
 - (6) Seisu valley
 - (7) Shinjo and Takaki valley
- (b) Giron district
Dainanwo river valley
- (c) Toyen district
Mount Kappan (1 case)
- (d) Schinichiku district
Shakaro village (1 case)
- (e) Kagi district
Forest of Mount Ari
Tappan village
- (f) Ako district
Aryo valley
Maruyama near Shirinkaku Koshen
Plains between Ako and Chosha

Pescadores (Boko) Islands

These comprise 63 islands in Formosa Strait

The houses are surrounded by the endemic area and therefore all the inhabitants are exposed to infection. Tsutsugamushi disease is not known to be contracted in the fields far from human dwellings this may be because a strong monsoon carries salt water and damages grasses and plants so producing unfavourable living conditions for *Trombicula akamushi*. The ground around the dwellings is protected by coral walls and the trombicula develops there. The trombicula develops in the ground inside the coral walls.

Rattus rattus rufescens [the common house rat in Formosa and the Pescadores Islands] was found heavily infested with the mites and rickettsiae were found in its tissues.

The season is from April to November only with a peak in June and July. Children are especially affected 70 per cent of cases being in children under 15 years of age and 38.6 per cent in those under 5 years. There are 30-80 cases a year the case mortality varies up to 21 per cent.

Borneo

A fatal case of mite fever in a European was reported by BESSEM in 1935. The infection was acquired in the western Division of the island. The diagnosis was confirmed serologically the serum agglutinating *Proteus OXA* to a titre of 1/1500 and being negative with *OVI*. A case of tropical typhus was reported from Brunei in the north of the island in 1939.

New Guinea

The disease occurs in the Mandated Territory of New Guinea including New Britain and in Papua. Although Dr. ROOK reported in 1938

that endemic typhus (pseudotyphus of Schuffner) did not occur in Dutch New Guinea GUNTHER saw a fatal case which had been contracted within a very few miles of the border of Dutch New Guinea. In the Mandated Territory it appears to affect the white races only the natives being apparently immune [but see Papua below]

Gunther gives the following distribution of cases —

	Cases		Cases
Morobe District—		Madang District—	
Wau area	4	Madang area	2
Upper Watut area	5	Markham and	1
Bulolo-Bulva area	4	Sepik District—	
Ramu area	1	Green River area	1
New Britain	2	Maprik area	2
		A tape area	1
		Wewak area	1

Clinically and serologically the fever resembles tsutsugamushi disease. The vector according to Gunther is probably *Trombicula minor*. Its principal hosts are Bandicoot (*Echymipera cockerelli*) bush pig (*Sus papuensis*) bush fowl (*Meapodius diuerrei*) bush turkey (*Taliallus jobiensis*) cassowary (*Casuarus casuarus*) ground pigeon (*Gallinolumba jobiensis*)

Papua

GUNTHER says that according to Dr F J WILLIAMS Chief Medical Officer no endemic typhus has been observed in white people but several cases of a similar form of fever have recently been found among natives. Gunther remarks that the Papuans are a different race from the natives of the Mandated Territory and unlike the latter suffer severely from the bites of mites.

LUTSON (Port Moresby) quoted by Gunther says that scrub itch in the Delta Division is caused by a mite resembling *Trombicula* *firsti*. Though natural barriers may prevent spread of the disease to Papua Gunther thinks that it may spread along the coastal districts into the neighbouring territories.

MAY (1941) reports two cases in Europeans in Papua. He thinks it probable that the disease has long existed there in the natives though this is the first occasion on which its presence has been proved by serological tests.

PARR and OFFENBRANTZ (1943) record 36 cases of mite-borne typhus diagnosed clinically and serologically in the South Pacific area.

Queensland Australia

There has been some confusion owing to the occurrence in north Queensland of several fevers with similar clinical characters. They have been called by various names — Mossman fever scrub fever endemic glandular fever Sarina or West Plains Creek fever coastal fever. These were investigated by HEASLIP MATTHEW and others.

According to Heaslip dengue and leptospirosis also occur. The coastal fevers include tsutsugamushi and another fever caused by an organism related to the anthrax bacillus both infections may occur

together in the same patient Tsutsugamushi was definitely diagnosed by serum agglutination of *Proteus* $\Delta\Delta$ in 1935. It occurs in the eastern coastal area of north Queensland between Cooktown and Ingham. Heaslip gives the following localities—West Cairns, Double Island, Babinda, Tully, Edmonton, Mourilyan, El Arish, Jordan Creek, Cairns, Intake, Little Mulgrave, Gordonvale, Queerah, Redlynch, Mossman, Daintree, Edgehill, Cooktown, Ingham, Meerawa, Yorkies Knob.

Most of his patients lived in the Cairns district. He thinks that the disease probably occurs in other places in Northern Australia.

MATHEW (1938) mentions also Innisfail, Tully, Kuranda, Tolga, Atherton and Millar, Millaa and says that in the Cairns area there are at least four clearly defined foci of $\Delta\Delta$ fever—West Cairns and Edgehill, Edmonton and Hambledon, Intake and Redlynch, Double Island and Yorkies Knob.

Tsutsugamushi occurs mostly among cane farm workers and road makers clearing the scrub. The probable vector is *Trombicula deliensis*. The serum of one bandicoot (*Perameles nasuta*) agglutinated *Proteus* $\Delta\Delta$ 1/250.

Java

Cases of mite fever are said to be rare. WOLFF and DE GRAAF (1939) reported two cases contracted in scrub jungle. Serum agglutinated *Proteus* $O\Delta\Delta$ 1/200 and 1/400 and numerous rickettsiae were found in guinea pigs inoculated with the patients' blood.

LEIMENA (1941) described a case in a man from Bandoeng who had never been out of Java. The Weil-Felix reaction with *Proteus* $O\Delta\Delta$ was positive at a titre of 1/400.

Sumatra

Mite fever occurs on the east coast of Sumatra and especially in Atjeh at the northern extremity. VAN DER SCHROEFF (1941) reported an epidemic in the Atjeh area among coolies clearing jungle growth. *Trombicula deliensis* and *Amblyomma* are abundant and parasitic on mice, rats and the lalang bird. The local name of the fever, according to KOTTER (1940) is *Seulumeum fever*. He mentions the localities Koetarodja and Seulumeum. WALCH (1922) found the incidence chiefly among workers on tobacco estates situated between the central mountain chain and the east coast; the tobacco fields are only cultivated for one year in eight or nine years. Mite fever was also found in workers on overgrown rubber estates.

Malaya

The disease is known to occur in the four Federated Malay States—Selangor, Pahang, Perak and Negri Sembilan and according to ANGSTEN (1933) six cases were reported from Kedah. It occurs sporadically. Cases of tropical typhus, some of which have been confirmed serologically with *Proteus* $\Delta\Delta$, have been reported also from Johore, Kelantan, Trengganu and the Straits Settlements.

The insect vector is thought to be *Trombicula deliensis* and the animal reservoir is probably the Malayan rural rat *Rattus rattus jalorensis*. GATER found *Trombicula akamushi* on estate labourers in Selangor and also on *Rattus rattus diardi*, the common urban rat, and *R. rattus jalorensis*. He found *T. deliensis* frequently infesting these rats and

also other rats squirrels and some other animals but less commonly on man than *T. akamushi*. LEWTHWAITE found that most of the 154 cases of rural typhus observed during the period 1927-1930 occurred in outdoor labourers engaged in pruning and weeding on a palm oil estate some cases occurred in similar workers on rubber estates. O'CONNOR treated the disease in bullock drivers and cowherds who visited overgrown abandoned agricultural land. There is no clear seasonal influence in Malaya but the seasons are ill-defined there.

French Indo China

Fever of the tsutsugamushi type occurs in the five divisions—Cambodia Cochin China Annam Laos and Tonkin. Neither vectors nor animal reservoirs have been determined.

Burma

MAITRA and GUPTA (1936) made extensive serological tests. They could not state precisely where infection occurred but gave the following localities from which positive *XA* sera were received.

Lower Burma—Rangoon Syriam Henzada Prome Toungoo Bassein

Upper Burma—Yametha Meiktila Kyaukse Shiwebo Chin Hill Katha Southern Shan States Northern Shan States Mandalay Maymyo Myittha

India

The mite borne type of typhus fever has been found in the Simla Hill Madras and Bombay. WOODHEAD and DUTTA (1941) examined sera from various parts of Assam where no typhus fever has hitherto been reported. They used *Proteus O\19 O\1A* and *O\2* and found that 8 out of 203 sera gave diagnostic titres with *O\1A* one agglutinated at 1/3 000 another at 1/800 and a third at 1/50.

BOYD (1935) found 43 cases whose sera gave preponderating agglutination with *Proteus XA* of these 35 were clearly defined 21 being British and 14 Indian. He mentions the following localities—

Districts—Lahore (15 cases) Meerut (5) Bengal and Assam (6) Deccan (8) Burma (1)

Stations—

British—Kasauli Calcutta Dagshai Sabathu Chakrata Dinafore Jhansi Mingaladon

Indian—Bareilly Alipore Jubbulpore Trimulgherry Landsdowne

There was no evidence of mite transmission.

BUSH (1936) recorded six cases four British and two Indian. He gives the following localities in the Simla Hills—Solon Dagshai Kasauli Nalwa (near Kasauli).

MACNAMARA (1935) described an epidemic in the Simla Hills Stations—Sabathu Dagshai and Kasauli. No vector or reservoir was found.

At the King's Institute Gundy Madras Presidency out of 4 381 sera examined 16 gave a positive result with *Proteus O\1A* at a titre

of 1/200 or more. No virus was isolated. In the 1936 report the sera of 66 out of 134 squirrels examined were positive to OVA in dilutions of 1/25 to 1/200.

Bombay

PATEL (1943) found that the serum of one out of six cases of typhus fever was positive to OVA at 1/1500 dilution.

Ceylon

LUCIUS NICHOLLS (1941) reported a case in a European who apparently contracted the disease while on a shooting trip in the east of the island. His serum agglutinated *Proteus* OVA to a titre of 1/500.

WIJFRAMA (1936) observed two cases, one in an Indian and the other in a Sinhalese. Both gave agglutination with *Proteus* OVA 1/5000 and rickettsiae were found in guinea-pigs inoculated with the blood of one patient.

China

Japanese authors state that fevers like tsutsugamushi are described in old Chinese writings but it is at present not known to occur in China.

RAYNAL (1939) in a paper on exanthematic fevers in Shanghai states that there certainly exist locally other exanthematic fevers which resemble Japanese river fever but their presence has not yet been convincingly demonstrated.

Korea

WEIR (1915) described 15 cases of fever which he called paratyphus occurring in the spring and early summer.

DE LANGEN and LICHTENSTEIN (1936) referring to mite borne typhus say that what is in all probability the same disease is also found in Korea and the Philippine Islands.

Philippine Islands

The only evidence of the possible existence of fevers resembling mite borne typhus appears to be the report by ASHBURN and CRAIG in 1908 of two cases seen there in 1906 by the former. No further cases are recorded in the *Philippine Journal of Science* since that date. Several text books (MENSE, STITT, MANSON, BARR) state that it occurs or probably occurs there but these authors may be relying on the report of Ashburn and Craig.

Samoa

POLECK (1925) reported the presence of a fever clinically resembling typhoid fever but giving negative results with agglutination tests. He suggested that it was probably pseudotyphus. There were some cases in Europeans.

Other Places

Although mite borne typhus does not appear to have been reported from Siam, Hainan and other Pacific islands it cannot be assumed that they are free from it.

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SUMMARY OF RECENT ABSTRACTS

V. LEISHMANIASIS

VI. CERAL

Epidemiology

BOIX BAPRIOS (p 23) refer to the epidemiology of kala azar in Spain. Here incidence is most heavy on the Mediterranean coast and in the Madrid area. The infantile form predominates and is characteristic of Mediterranean kala azar. The chief reservoir is the dog. KOWALZIG (p 120) refers to five cases of kala azar in German soldiers stationed in Spain during the civil war.

The formal gel reaction is positive in 81 per cent of dogs in the Petrich district of Bulgaria. DRENOWSKI (p 121) concludes from this that canine leishmaniasis is widespread there.

POTENZA and ANDEZE (p 891) have diagnosed by ascerotomy a second case of kala azar in Venezuela. Attempts to correlate the two cases with the presence of *Phlebotom* have not been successful but more work is obviously needed.

Transmission

SWINERTON *et al* (p 227) trace the course of the various investigations made since the early days of the kala azar Commission on the transmission of the disease. *Phlebotomus ar entipes* was suspected on epidemiological grounds, but experimental proof of transmission to animals and man was almost impossible until it was found that after the infection feed the flies should be maintained on a diet of raisins instead of blood. On this diet the development of flagellates was much greater and led to blockage of the pharynx. The authors report found to be capable of transmitting infection. These successes successful transmission by the bite of such flies to all of five volunteers with incubation periods of five months and upward. But the virulence may have been due to the adoption of this technique but the virulence of the parasites may have been a factor.

PARRON *et al* (p 277) in Algiers caught a large number of sandflies over a period of five months in the kennels of dogs known to be suffering from generalized leishmaniasis. Most of the flies were *Phlebotomus perniciosus* and *P. longicarpus* and 20 and 16 per cent respectively were found to harbour flagellates of the *leptomonas* type usually in the stomach but occasionally in the oesophagus or proboscis. These two species are therefore to be regarded as vectors of kala azar. In estigation indicated that infection is not transmitted from adult female sandflies to their offspring.

Clinical Features

PELÁEZ REDONDO (p 375) notes that in Spain as in other Mediterranean countries there has been an increase in the incidence of kala azar in adults in recent years. He describes the clinical features

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the Tropical Diseases Bulletin 1943. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

noting that spleen puncture is the most certain method of diagnosis. Parasites are less likely to be found by sternal puncture and blood examination in his patients was invariably negative. LAFUENTE and GODARD (p 892) describe two cases of kala azar in children in the province of Constantine Algeria. In one the diagnosis was made by spleen puncture in the other the leishmania were found abundantly in a film of the peripheral blood.

MIRZOIAN (p 295) describes from Samarkand an early sign of kala azar in children. Several months before the disease can be diagnosed clinically there appear on the face minute papules (the size of a pin head) which increase to the size of a lentil are pink or red in colour and disappear in a few months leaving pigmented spots. Leishmania can be found in these papules. Later the sternal marrow commonly becomes positive and lymph glands and spleen enlarged. The papules do not develop into oriental sores and as kala azar and oriental sore are only very rarely found together the author considers that the papules are part of the kala azar syndrome. He thinks that the papules develop at the sites of sandfly bites since they appear in summer and autumn are found only on the face (which is most exposed) and because leishmania are not found in scrapings from the skin of other parts. The author emphasizes the value of these papules in early diagnosis.

COLE (p 229) reports kala azar from the region north of Lake Rudolph Abyssinia. Over half the patients admitted to hospital died and in some of those who survived a nodular rash developed which coalesced to form a warty mass and in which leishmania were found. The mass finally regressed no treatment appeared to be necessary for this condition.

CHUNG (p 228) reports a case in which the lymphatic glands of various regions of the body apparently became infected probably from a lesion in the mastoid area but in which good general resistance presumably prevented visceral infection. One excised gland proved infective for a hamster but it was not possible to find leishmania in liver or sternal puncture material or in the excised gland.

NIYOGI and RAY (p 762) have prepared an antigen for use in a complement fixation test from washed flagellates of a 48 hour culture of *L. donovani*. The test was positive in 10 cases of kala azar but not in two of cutaneous leishmaniasis or in several patients with other diseases.

Treatment

NAPIER *et al* (p 121) report on the treatment of 100 cases of Indian kala azar with stilbamidine the introduction of which in their opinion constitutes a great advance in therapeutics. They note that for diagnosis spleen puncture was the most reliable procedure and that the aldehyde test was positive in 74 cases. The patients were of all ages from infancy to over 45 years. Stilbamidine was administered as a 1 per cent solution usually intravenously daily for 10 to 15 days in doses (for adults) of 0.025 gm 0.05 0.06 0.075 0.09 and 0.1 gm up to a maximum of 1.0 mgm per pound of body weight. Reactions are common sometimes alarming but apparently free from danger and may be controlled by injections of adrenaline before the stilbamidine is given. In this series there were two deaths and two relapses the remainder were cured.

KIRK and SATI (p 684) report on 43 cases of kala azar treated in the Sudan with aromatic diamidines. Eight patients died (but five were in an advanced stage) and 35 were discharged as provisionally cured. Of these 35 patients followed up for 2-3 years four could not be traced and three died. Thus 28 of 43 patients were known to be alive after a considerable lapse of time. [It will be remembered that kala azar in the Sudan is a severe disease with a high mortality rate.]

FULTON and YORKE (p 23) discovered that stilbamidine becomes much more toxic for mice if a solution is allowed to stand in sunlight before use. Exposure for two days greatly increased toxicity but no further increase was found after exposure for 14 days nor had boiling or keeping in the dark for 14 days any comparable effect. The immediately fatal results produced in mice by the degenerative liver changes and nerve lesions noted in man and animals the latter seem to be caused rather by cumulative action than by acute toxicity. It is therefore not possible to say if the late effects in man are due to exposure of the drug to light but the investigation does lead to the conclusion that solutions for therapeutic use should be freshly prepared. In comment HAWKING notes that a fresh solution is strongly fluorescent in ultra violet light but that fluorescence gradually diminishes on continued exposure to light therefore clear that energy is drawn from the light and that molecular change occurs.

BARBER *et al* (p 576) have followed up this work. They think that the toxic product is almost certainly 4,4-diamidino phenyl benzyl carbinol and that the reaction to light which occurs in aqueous solution is an addition of the elements of water to the double bond of the stilbene linkage. Other therapeutic diamidines have shown no such biological or chemical properties and the change is associated with the unsaturated stilbene linkage. The amidine groups are not affected. The toxic substance has been isolated and its pharmacology studied. Its action differs rather quantitatively than qualitatively from that of the original substance. The toxic product is almost inactive therapeutically against *Trypanosoma equiperdum*.

Investigating the subject further FULTON (p 683) has shown that only the unsaturated compound are affected. Water is added on and less therapeutically active. Solutions of unsaturated amidines (such as stilbamidine) should be freshly prepared for use or should at least be stored away from light. GOODWIN (p 684) has confirmed these findings by spectroscopic methods.

HENRY and GRINDLEY (p 100) have studied the effect of various substances on the fluorescent property of stilbamidine. In the course of this work they noted that when solutions of stilbamidine are added slowly to normal saline a precipitate appears which redissolves on shaking. This observation is relevant to the optimum rate for intravenous injection. The authors give details of a fluorescence test for estimation of the amount of stilbamidine in fluids. Such a spot of the fact that fluorescence persists in filter paper on which a spot of the fluid has been placed. The test can be applied to serum and other body fluids and to urine. In this way it has been shown that after injection excretion of the drug takes place in the urine but ceases after about 24 days by which time about 10 per cent has been eliminated. When stilbamidine is added to citrated blood about 80 per cent is adsorbed to the red cells and cannot be recovered by

haemolysis or other methods. In comment HAWKING notes that if stilbamidine is adsorbed by the red cells it is probably in some non fluorescent form since fluorescence cannot be detected in the cells of mice injected with the drug.

WIEN (p 682) has studied the pharmacology of certain aromatic diamidines. Poisonous doses cause general depression of the nervous system and death from respiratory failure with repeated sublethal doses symptoms suggesting cumulative poisoning occur. The fall in blood pressure which takes place after intravenous injection is prevented or much reduced in animals by previous injection of calcium. It is due mainly to peripheral vaso dilatation. The effects on the heart are small and transitory.

WIEN *et al* (p 683) show that certain of these aromatic diamidines produce hyperglycaemia partly due to the increased output of adrenaline in the experimental animals. Chronic poisoning leads to fatty degeneration of the liver and the compounds also act on the kidneys which show cloudy swelling and fat globules in the convoluted tubules with increase in blood urea and non protein nitrogen.

CHUNG *et al* (p 229) in Peiping report that the results obtained with solustibosan in kala azar are as good as those with urea stibamine or neostibosan but that in terms of antimony the amount required is much greater. The dose is 6-12 cc on alternate days to a total of 60-162 cc. The solution contains 20 mgm of metallic antimony per cc. It can be given intravenously or intramuscularly.

CHUNG and CHOW (p 229) report that the sodium salt of mannite antimonite acid which contains 21 per cent of antimony gives a higher rate of cure in hamsters infected with kala azar than any other antimony compound. Solutions of 30 and 50 per cent are used. They can be sterilized by boiling and can be injected intravenously intramuscularly or subcutaneously. Toxicity is relatively low and three times as much antimony can be given in this form as in the form of solustibosan.

BRAHMACHARI and BASU (p 121) report an unusual case of dermal leishmaniasis which developed two years after apparent cure of kala azar. Treatment with urea stibamine has not prevented a later relapse.

CUTANEOUS (ORIENTAL SORE)

LATYSHEV and KRIUKOVA (p 296) give an account of the two types of oriental sore which have previously been differentiated in Turkestan. The first Pendzhikent sore is found in rural areas its reservoir hosts are wild rodents (gerbils marmots) it occurs chiefly in summer and autumn has an incubation period of 3-6 months and is relatively acute with moist lesions in which parasites are scanty. The second Ashkhabad sore is a disease of towns man is probably the reservoir since rodents are absent it is found throughout the year has a longer incubation period and is more chronic with dry lesions in which parasites are numerous. In human inoculation experiments these two forms remain true to type.

LATYSHEV and KRIUKOVA (p 24) have confirmed the Russian discovery that wild rodents are the reservoirs of *Leishmania tropica* in Turkmenia. The leishmania were proved infective by inoculation of man. They have found infection in 30 per cent of *Rhombomys opimus* (up to 56.3 per cent in November-December) and in a proportion of *Meriones erythraurus* and *Spermophilopsis leptodactylus*.

Indian origin numbered 138 667 in 1931. There were about 5 000 Europeans and 5 000 Chinese. There has been a considerable admixture of races.

The general death rate for 1941 was 15.95 per thousand to which malaria contributed 0.98, pulmonary tuberculosis 0.97 and enteric fever 0.26. Malaria cases clinically diagnosed reported by health officers in 1940 numbered 20 691. Of the 2 128 positive blood slides examined in the Government Bacteriological Laboratory in 1941 *P. falciparum* was found in 1 769, *P. vivax* in 345 and *P. malariae* in 14.

During the present survey 26 349 school children were examined for splenomegaly, about a quarter of the total number of children in the colony of the age group 5 to 15. Enlarged spleens were found in 2 224, a spleen rate of 8.4. The county spleen rates varied from 53.1 in St. David in the north-east corner of Trinidad, 37.5 in Mayaro in the south-east corner and 33.1 in St. Andrew on the east coast to 3.4 in San Fernando on the west coast. The spleen rates in towns were: Port of Spain 1.7 and San Fernando 1.8.

The parasite rates of these school children varied directly with the spleen rates. For the colony as a whole 52.5 per cent of the children with enlarged spleens harboured parasites, 7.5 per cent of children without enlargement of spleen were parasite positive. The relative incidence of species of malaria parasites was *P. vivax* 26.7, *P. malariae* 15.6 and *P. falciparum* 57.7 per cent. *P. malariae* and mixed infections are relatively more common in the more malarious areas. *P. vivax* infections are much more frequent among East Indians than among Negroes.

In Tobago but little evidence of malaria was found in the seven schools that are situated at an altitude of over 400 feet.

During the present survey 13 species of anophelines were found in Trinidad: *A. aquasalis*, *A. oswaldoi*, *A. albivittatus*, *A. neomaculipalpus*, *A. apimacula*, *A. mediopunctatus*, *A. nimbus*, *A. eiseni*, *A. bellator*, *A. (Arribal) agarti* sp., *A. homunculus*, *A. anoplus* and *A. (Hertesia) sp.* The last four species have not previously been reported from Trinidad. In Tobago three species were found: *A. aquasalis*, *A. neomaculipalpus* and *A. apimacula*.

A. aquasalis is the common coastal anopheline of both islands. It breeds in brackish water along the fringes of mangrove swamps, in ditches in coconut and sugar cane plantations and in water penned up by sand bars. Larvae have been found in fresh water streams as far as 10 miles inland, but the species is much more prevalent in coastal regions. Adults feed freely on animal and man; they leave house or stable at or before dawn. Oocysts were found in 46 of 1 383 wild caught *A. aquasalis* dissected (3.3 per cent) and sporozoites in 1 of 1 364 dissected.

A. bellator is plentiful in the heavy rainfall areas of central and northern Trinidad. It breeds in collections of water in bromeliads which heavily parasitize the immortal trees which serve as wind breaks and shade for cocoa plantations. There are areas of cocoa cultivation in southern, south-western and north-western Trinidad where immortal trees and bromeliads are both abundant but where *A. bellator* is either rare or absent. These areas have a much lower rainfall than have northern and central Trinidad where *A. bellator* is so excessively abundant. Adults bite man very freely; they may bite during the daytime. As many as 950 were collected in an hour and a half from four small boys sitting by the roadside. Females are most in

evidence in the evening at dusk. Of 1 263 *A. bellator* dissected oocysts were found in 10 (0.78 per cent) no sporozoites were found. A cheap practical method of control of *A. bellator* has yet to be found. *A. aquasalis* and *A. bellator* are the only vectors that have been incriminated. In Tobago *A. aquasalis* is the only vector of importance. Of the remaining species only *A. oswaldoi*, *A. albicans* and *A. neo maculipalpus* occur in sufficient numbers to be important if infected. The numbers of these species dissected were not large, none was found infected. *A. albicans* was found to be very susceptible to infection with *P. falciparum*. There is a close correlation between the presence of malaria and the presence of one or both of the species *A. aquasalis* and *A. bellator*. About half the area of Trinidad is free from malaria. In some areas domestic animals appear to divert large numbers of *A. aquasalis* from biting man. *A. homunculus*, *A. anoplus* and *A. (Kerteszia) sp.* are all bromeliad breeding anophelines with similar habits to those of *A. bellator* but they are much rarer than that species.

Norman White

FRAGA J. Malaria em Paranaguá (Inspeção preliminar) [Malaria in Paranaguá, Preliminary Survey] *Folha Med.* 1943 Oct 25 v 24 No 20 183-8

This preliminary survey report outlines the history of the nearly 400 year old town of Paranaguá on the coast of Brazil about 265 miles from Rio de Janeiro. It has a settled population of 12 600 and a considerable floating population. Its topography, housing and economic conditions, educational facilities and sanitary and medical organization are described. The spleen index of 1 649 persons of all ages examined was 11.6 per cent. Blood examination of these persons revealed *P. vivax* in 148, *P. falciparum* in 25, *P. malariae* in 1 and mixed infections in 7. A parasite index of 10.9.

The anophelines found included 4 species: *A. bellator* and *A. oswaldoi*. The two former are predominant and are believed to be the responsible vectors. They breed in collections of water at the base of leaves of bromeliads which extensively parasitize local vegetation.

Norman White

RASHINA M. G. [Malaria Parasite Carriers and their Control] *Med. Parasit. & Parasitic Dis.* Moscow 1943 v 12 No 3 13-14 [In Russian]

Under war conditions involving considerable movements of the general population and troops the danger of malaria spreading outside the endemic areas of the Soviet Union has increased considerably. In this connexion the rôle of symptomless carriers in the dissemination of malaria becomes especially important since these cases usually escape notice and little is known regarding the epidemiological significance of such infections. Moreover, preliminary surveys organized by the Central Institute of Malaria have shown that the carrier state in malaria is more common than was hitherto suspected. After discussing the general situation the author suggests the following measures of control: (1) continued examination of patients for prolonged periods of time (up to two years in the case of benign tertian and 12-14 months in malignant tertian); (2) systematic and repeated treatment of such

[June 1944

cases (3) mass blood examinations of the population (both healthy persons and patient) (4) increased use of mosquito netting
C 4 Hoare

DAVIES R A Observations on the Breeding of *Anopheles* (*Anopheles*)
clausi er Melgen J Trop Med & Hyg 1943 Dec -1944 Jan
1 46 No 6 71-6 6 figs

The author has bred *Anopheles clausi* er (*bifurcatus*) through several generations in cages which has not previously been done. Several other workers have shown that light (of some particular intensity and direction) may be effective in inducing mosquitoes and other Nematocera to perform a nuptial dance and then copulate. The author made a cage 5 feet long horizontally by 1 by 1 foot and put in it a dozen or so *A. clausi* er bred from wild larvae the females have previously fed on man. Outside the end of the cage he placed a 25 watt electric lamp at dusk. The males danced in the part of the cage near the lamp females entered the same pairing took place and fertile eggs were laid. Without the lamp successful pairing did not occur. The work as done in an unheated room at about 17° C and was repeated several times and over several generations. It was a matter of indifference whether the mosquitoes were fed on man or rabbit.

Working with a water bath it was shown that the total length of aquatic life of the same species (from laying of egg to emergence from pupa) is about 76 days at 10° C 33 at 18 C. The larvae were fed on powdered biscuit and yeast tablet.
P A Burton

MELNICK Z A *Anopheles bifurcatus* in Kara Kala in the Early Spring
Med Pa 1943 1 No 1 6-
(In Russian)

RAJINDAR PAL On the Bionomics of *Anopheles culicifacies* Giles
Part I Longevity under Controlled Conditions of Temperature and Humidity J Malaria Inst of India 1943 June 5 No 1
77-83 3 charts [23 ref]

The author defines the length of life of *A. culicifacies* under controlled conditions in the laboratory and attempts to relate his data to numbers of adults captured at different seasons in the Punjab. The laboratory work was done by breeding from eggs laid by wild females. The adults bred in this way were given a single feed on man and put in a small cage in a desiccator with mixtures of sulphuric acid and water to control humidity. The desiccators were kept in thermostat. It seems that at 25 30 or 35 C (77 86 95 F) the insect survived longer at moderate humidities (60 or 80 per cent) than in saturated air an interesting but unexplained observation. The total number of insects used at each point was small and the statistical validity of the conclusions might well be considered. A proportion of the mosquitoes survived one hour at 41 C none at 47 C. None survived one hour at -2 C but the zone between that temperature and 12.7 C was not explored. The latter temperature which corresponds roughly to winter temperatures in the Punjab was favourable to the survival of adults in desiccators. Adults and larvae could both be found in winter in nature.
P A Burton

- ROI D N The Role of *Anopheles subpictus* Grassi as a Carrier of Malaria *J Malaria Inst of India* 1943 June v 5 No 1 117-21 [19 refs]

Larvae and adults of *A. subpictus* were collected from the salt lake areas adjacent to Calcutta. The adults were taken in cowsheds which for the most part are separated from dwelling rooms by thatched partitions which offer no obstacle to the passage of mosquitoes. Precipitin tests showed that 25 per cent of 1515 engorged females had ingested human blood. This figure is very much higher than any recorded in previously published observations. Most reports have stated that the species is almost exclusively zoophilic. Batches of *A. subpictus* were fed on *P. malariae*, *P. vivax* and *P. falciparum* gametocyte carriers control tests being made in each case with *A. stephensi*. The oocyst and sporozoite rates were 29 and 7 per cent respectively as compared with 50.9 and 45.3—the *A. stephensi* rates. Laboratory studies of the longevity of *A. subpictus* showed that in Calcutta 16 per cent of naturally fed females survived a period of 10 days during January and February. The author concludes that though in the more humid parts of India naturally infected *A. subpictus* may be encountered the danger of the species from the point of view of malaria transmission is negligible.

Norman White

- SUNDARESAN B & RAO M A The Distribution of *Anopheles sundaus* in Vizagapatam District with Notes on certain Points of Differentiation between the Larvae of *A. sundaus* and *A. subpictus* *J Malaria Inst of India* 1943 June v 5 No 1 107-12 1 map

- GAST GALVIS A Biología y distribución geográfica de los Anophelinos en Colombia [Biology and Distribution of the Anophelines of Colombia] *Rev Facul de Med Bogotá* 1943 Aug v 12 No 2 93-103 11 figs & 5 maps English summary

- KEKHCHER O V [The Duration of Malarial Infection in Man according to Information at the Sochi Malaria Station] *Med Parasit & Parasitic Dis* Moscow 1943 v 12 No 2 3-8 2 charts [In Russian]

The author discusses the high incidence of relapses and chronic cases of malaria which continue to be recorded in local registers in spite of a general decrease in the incidence of fresh cases as the result of the successful application of antimalarial measures. This discrepancy is attributed to an exaggerated idea among medical officers regarding the duration of malarial infections with the result that reinfections are interpreted as relapses while various other ailments occurring in persons with a history of malaria in the past are diagnosed as chronic malaria without any objective criteria [see also this *Bulletin* 1944 v 41 258].

On the other hand observations based on the determination of the number of fresh cases have shown that in the Soviet Union the duration of benign tertian malaria does not as a rule exceed 12-18 months while that of subtertian is from 2 to 12 months [see this *Bulletin* 1943 v 40 345].

Similar observations were made by the author who studied the records of the Sochi Malaria Station (Caucasus) where detailed registers entered by a competent malariologist have been kept since

1922 A statistical analysis of 5504 case histories showed that the majority of patients (89-94 per cent) recovered in the course of the first year of the infection. In individual cases (0.9-4.1 per cent of 4266) benign tertian malaria lasted 3-4 years while only 0.16 per cent of 1037 subtertian cases manifested symptoms during the second and third years. The course of quartan malaria was similar but the small number of cases (107) does not warrant general conclusions regarding this disease.

C A Hoare

BAUM G Latent Malaria presenting as Anaemia [Memoranda] Brit Med J 1944 Feb 26 289-90

The author of this note writes from Khartoum and describes two cases in which anaemia (red cell counts of 3.64 and 2.9 millions respectively with colour indices of 1.2 and 1.0) not susceptible to treatment with iron cleared up promptly after a course of antimalarial treatment. Each patient had previously had malaria but in each the blood was persistently negative except that the first man had an attack of pyrexia during which subtertian parasites were found. It was this attack which led to the substitution of antimalarials for (ineffective) iron preparation.

Charles Wilcocks

WHITEHILL R Cerebral Malaria A Case Report Bull Johns Hopkins Hosp 1943 Oct 1 73 No 4 263-74 1 chart

This very detailed case report is not amenable to summary. The patient a 23-year-old white male was infected with *P. falciparum* in Guadalcanal. He was evacuated to New Hebrides. In spite of having received what is usually considered to be adequate specific treatment with both atabrin and quinine he developed symptoms of cerebral malaria some five weeks after the initial attack of malaria. He also developed symptoms of acute glomerular nephritis. He eventually made a complete but by no means an uneventful recovery. Intravenous quinine was administered. The author considers this to be the treatment of choice in the patient who is comatose from cerebral malaria. At one stage of the illness it seems probable that part of the haematuria was caused by quinine. The substitution of atabrin for quinine and plasmoquine was followed by a steady diminution of the haematuria. The opinion is expressed that the patient had a true malaria nephritis caused by blocking of the glomerular capillaries with malaria parasites.

Norman White

KNEEDLER W H Malignant and Atypical Malaria Reprinted from Clinics 1943 Dec 2 No 4 809-27 [24 refs]

This is a comprehensive account of the signs and symptoms that may result from infection with *P. falciparum* more especially the pernicious forms of subtertian malaria. Much attention is paid to the differential diagnosis of malignant malaria especially in the presence of symptoms simulating those of some quite other pathological condition. In the treatment of pernicious cases the author expresses a preference for quinine in the initial stages followed by a course of atabrin after the pernicious symptoms have been brought under control. The first dose of quinine should be intravenous (10 grams of quinine dihydrochloride in 200 cc. of normal saline injected in not less than 15 minutes).

Subsequent injections may be intramuscular which are almost as good even for the first injection (10 grains of quinine hydrochloride in 2 cc of water or at most 15 grains in 3 cc) There is never any indication for intravenous atabrin since only small doses are advisable by this route and the large initial doses necessary in malignant attacks can effectively be given intramuscularly If atabrin be used in coma cases 0.4 gm in 10 cc water is given intramuscularly half in each buttock then 0.2 gm seven hours later and repeated 12 hours after that and then every 18 hours while the coma continues Useful indications are given for the ancillary treatment of the more prominent symptoms

Norman White

EPSTEIN E G [Treatment of Malaria with a Massive Initial Dose of Acriquine] *Med Parasit & Parasitic Dis* Moscow 1943 v 12 No 3 18-24 [In Russian]

At present the standard method of treatment of malaria with acriquine (=atabrin mepacrine) adopted in the Soviet Union is a three cycle course of 5-3-3 days with intervals of 10 days between the cycles the daily dose for adults being 0.3 gm Under war conditions it was desirable to modify the treatment so as to obtain the maximum effect in the shortest time without increasing the amount of the drug used

A method of treatment on these lines was adopted by the author after successful tests in 120 cases The course consists of a large dose (0.5-0.6 gm given in two portions) administered on the first day of the first cycle this is followed by the usual dose (0.3 gm) daily on the second third and fourth days in succession leaving the fifth day without treatment Presumably the standard course was followed in the remaining cycles

The new method of treatment proved to be more effective than the standard one both in benign tertian and subtertian cases attacks of fever terminating 24 hours earlier than previously (in 1.2-1.8 days) without any toxic effects or relapses [Similar high initial dosage has been used by British workers see this *Bulletin* 1942 v 39 666 1943 v 40 821]

C A Hoare

KÄHLER O H Beitrag zur Atebrinprophylaxe und Behandlung der Malaria [Contribution to Mepacrine Prophylaxis and Treatment of Malaria] *Deut med Woch* 1943 Sept 3 v 69 No 35/36 630-31

Two cases are described of unusual reactions to the prophylactic (suppressive) and therapeutic administration of mepacrine (atabrin)

Case I —Exposed to malaria in South Russia but received prophylactic mepacrine in the usual dose [0.06 gm daily] At the end of the season he received 0.1 gm mepacrine thrice daily for five days ending on October 14th 1942 On October 13th and 14th he felt feverish and on October 16th an attack of benign tertian malaria developed with parasites in the blood He was given 0.3 gm by intramuscular injection daily on October 17th 18th and 19th on October 20th 0.1 gm was given three times by mouth On the evening of that day curious cerebral symptoms developed The patient became forgetful and unable to concentrate although consciousness remained clear These

[June 1944]

symptoms lasted for an hour on each evening of October 20th to 23rd and then ceased. Mepacrine was discontinued on the evening of October 21st. The blood was free from parasites on October 27th.

Case II—A man previously infected with benign tertian malaria parasites being demonstrated regularly. On October 11th he felt feverish. On October 17th and 13th he took 0.1 gm thrice daily. On the evening of October 13th a clinical attack occurred although no parasites could be found in the blood. The mepacrine was discontinued for diagnostic reasons and on October 16th benign tertian parasites were demonstrated. From October 17th onwards he was given 0.3 gm intra-muscularly daily for four days and then the same amount daily by mouth for three days. Plasmoquine (pamaquin) was given for three days ending on October 28th. On October 27th the blood was free from parasites. The temperature continued to be unsteady until November 1st when another rise occurred. The patient was then given quinine and no further attacks occurred.

Attention is directed to—
(1) The onset of a malarial attack so soon after prophylactic and therapeutic courses of mepacrine (Case I). This is an exceptional case which should not throw doubt on the usual antimalarial action of mepacrine.

(2) The occurrence of cerebral symptoms due to mepacrine, a case which is most unusual for such symptoms to follow the standard courses of treatment.

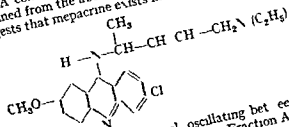
(3) Failure of the temperature to respond quickly to mepacrine by returning to the normal level. (These cases are exceptional and should not cause unbelief in the efficiency of the antimalarial action of mepacrine in the great majority of cases. In the absence of data concerning the plasma concentration of mepacrine it is difficult to decide the cause of these failures to respond to the drug.)

F. Haukin

SCUDL J V & JELINEK Viola C. **Urinary Excretion Products of Atabrine** *J Biol Chem* 1944 Jan 152 No 1 27-37 4 figs

The urine of dogs receiving mepacrine (atabrine) was collected and four fractions containing basic acridines designated A, B₁, B₂ and C were separated out according to their solubility in isoamyl alcohol, benzene and other organic solvents.

Fraction A contained unchanged mepacrine dihydrochloride. Evidence obtained from the absorption spectra at pH 2.1 and 8.5 respectively suggests that mepacrine exists in two tautomeric forms



the hydrogen marked by an asterisk oscillating between the nitrogen atoms on either side of the acridine group. Fraction A also contained an orange yellow material not fluorescent probably not acridine but not occurring except when mepacrine is given. Fraction B₁ contains

an acridine compound much like mepacrine but probably possessing a phenolic group $-\text{OH}$. It is suggested that this has replaced the methoxy group $\text{CH}_3\text{O}-$

Fraction B_2 contains another derivative of mepacrine in which the basic side chain may have undergone partial degradation

Fraction C contains another derivative of mepacrine which probably contains a phenolic group. It shows no schizonticidal activity when tested against avian malaria and it is more toxic than mepacrine

This group of isoamyl alcohol soluble acridine bases excreted in the urine accounts for only about 5 per cent of the mepacrine ingested. Only small or negligible amounts are excreted as water soluble acridines of the ethereal sulphate or glucuronide type. In the case of the rest of the dose the acridine ring is presumably broken down. Of the 5 per cent excreted by the dog as acridine derivatives 25 per cent is unchanged mepacrine 2-5 per cent consists of Fraction B_1 and 2-5 per cent as Fraction B and the rest as Fraction C. Rats excrete about 2 per cent of the dose within 24 hours. 90 per cent of the acridine excreted is unchanged mepacrine none is B_1 2-5 per cent is B_2 and 2-5 per cent is C. In a sample of human urine there was as much Fraction C as unchanged mepacrine. In rabbits the proportions excreted are different again

[This paper contains extensive chemical information which should be consulted in the original by those interested] *F Hawkins*

BRODIE B B & UDELFRIEND S The Estimation of Atabrine in Biological Fluids and Tissues *J Biol Chem* 1943 Nov 1 151 No 1 299-317 4 figs

Mepacrine (atabrine) is extracted from the biological fluids by suitable organic solvents and its fluorescence under ultraviolet illumination is measured in a suitable fluorometer. The No 12 Coleman electronic photo fluorometer is recommended with a 2 mm No 5113 Corning glass filter (Coleman B4) to isolate the activating energy and a Corning No 3385 filter (Coleman PC9) to limit the transmission of the resulting fluorescent light

Procedure — Add 3 ml of 0.2 N NaH_2PO_4 and 30 ml of ethylene dichloride to 1 to 10 ml of biological material in a 60 ml glass stoppered Pyrex bottle (blood is first hemolyzed with 2 parts of water). Shake vigorously for 5 minutes preferably on a shaking apparatus. Decant into a 50 ml centrifuge tube and centrifuge for 10 minutes at moderate speed to break the emulsion. Remove the supernatant layer by aspiration. A solid gel sometimes forms in the ethylene dichloride which may be broken by vigorous stirring with a glass rod. A second centrifugation at high speed will then produce a clean separation of the two phases. Return the ethylene dichloride solution to the original rinsed out bottle restraining the coagulum with a stirring rod. Add an equal volume of 10 per cent NaOH and shake for 3 minutes. Remove the major portion of the sodium hydroxide solution by aspiration and transfer the remainder of the contents of the bottle to a narrow test tube. Centrifuge for 1 minute. Remove the supernatant layer by aspiration. Wash the sides of the tube with water and remove the water by aspiration. Pipette exactly 20 ml of the ethylene dichloride into a prepared glass stoppered bottle add 1 ml of water and 10 ml of 85 per cent lactic acid and shake vigorously for 5 minutes. Transfer to a prepared narrow 35 ml centrifuge tube and centrifuge for 1

employed all expressed a preference for the hand pumped pressure tank type of equipment to all others tried

The use of Indian grown pyrethrum in the preparation of the insecticide has reduced the cost of spraying [this *Bulletin* 1943 v 40 14] Information regarding the preparation of a water emulsion of a locally extracted pyrethrum is given

Seven villages were sprayed in the 1941 season their populations varied from 88 to 7 620 The method of applying the insecticide varied in the different villages The decline in the parasite rate and the reduction in the size of spleens was marked in all cases In six untreated villages parasite rates were uniformly higher in 1941 than they had been in 1937 In Kasangdu population 1 790 the parasite rate had been reduced from 57 to nil as the result of three seasons spraying and there were no larger spleens than size 1 This village was not sprayed in 1941 the parasite rate rose to 15 per cent and there were several size 2 spleens In one village every person was given a preliminary treatment with plasmoquine before spraying began the subsequent decline in the parasite rate was no greater than could have been achieved by spraying alone The villagers like spray killing and appreciate the benefits it confers they gave excellent co-operation The cost per person for the 1941 season varied in the different villages from 3 to 7½ annas The size of houses the distance between houses and the number of animal shelters influence the cost per person

Norman White

ANNESKE S Repellents in Malaria Control *South African Med J*
1943 Dec 25 v 17 No 24 383-6

The method of experiment is not fully described but it appears to have consisted in having human subjects in a series of huts into which *Anopheles gambiae* and *funestus* could enter freely and then at intervals during the night collecting and counting the mosquitoes that had entered the huts the proportion of males and females and the number which had fed Huts with control subjects were compared with those whose occupants were treated with various repellents The author concludes that plain citronella oil still holds first place as a repellent provided it is applied at three hourly intervals Tagetes oil and lard were of no value A cream containing naphthalene and a concentrated extract of pyrethrum (the precise formula is not given) was almost equal to the citronella if re applied every three hours If the huts were dusted with pyrethrum powder ($\frac{1}{4}$ oz per 100 sq ft at intervals of five hours) the number of mosquitoes feeding was still further reduced (to about one third of the figure for huts occupied by citronella treated subjects)

V B Wigglesworth

SUBBARAMAN A K & VEDAMANICKAM J C Trimming the Edges of Breeding Places near Human Habitations as an Antilarval Measure
J Malaria Inst of India 1943 June v 5 No 1 113-15 1 fig

The observations recorded were made in the Wynad S India It was shown that the removal of vegetation along the banks of a stream trimming the edges of the stream with a spade and the removal of loose stones and weeds projecting above the water surface along the edges of the stream were sufficient to eliminate entirely the breeding of

A fluviatilis the local vector and of other species as well. Thereafter weekly inspections and maintenance of the work are essential but the control measure is cheap
Norman White

ADISUBRAMANIAM T S & VEDAMANICKAM J C The Relationship between the Breeding Places of *A fluviatilis* and Human Dwellings and its Significance in limiting the Scope of Antilarval Measures
J Malaria Inst of India 1943 June v 5 No 1 53-8 2 maps

The inhabitants of the Wynaad (S India) live in small groups of huts along the margins of the valleys. In these valleys *A fluviatilis* the local vector breeds in streams and irrigation channel. The observations recorded were made in two villages Kalpatta and Sultan's Battery. All the channels forming breeding grounds in the neighbourhood of these two villages were measured off into 100 feet sections. Collections of larvae were made in each section once a week. The density of *A fluviatilis* larvae was found to vary inversely with the distance of the section from human habitations. The maximum density was always within 1 000 feet of such dwellings. The control of breeding by oiling along 1 000 feet in one of the areas resulted in a marked decrease in the number of adults caught in the nearby huts as compared with the previous year when no control measures were in force. The authors conclude that antilarval measures against *A fluviatilis* may be limited to breeding place within 1 000 to 1 500 feet of the dwellings they are designed to protect
Norman White

ADLER S & TCHERNOMORETZ I Development of Gametocytes from Extra erythrocytic Forms in *Plasmodium gallinaceum* [Correspondence] *Nature* 1944 Jan 13 83

The authors refer to their original work [this Bulletin 1942 v 39 594] in which they showed that in foals inoculated with emulsions of organ containing exo-erythrocytic forms of *Plasmodium allinaceum* or subjected to the bite of *Aedes aegypti* infected with that parasite intense and continuous quinine treatment prevents the formation of pigmented parasites but allows the extra-erythrocytic forms to persist. These forms do not develop further while quinine is given in high dosage but if it is stopped they undergo normal development in red cells. The authors have now shown that some of these exo-erythrocytic forms invade red cells and develop directly into gametocytes and that young gametocytes can be recognized 27½ hours after cessation of quinine. They approach their maximum size before the first cycle of erythrocytic schizogony is completed
Charles Wilscocks

JACOBS H R Immunization against Malaria Increased Protection by Vaccination of Ducklings with Saline-Insoluble Residues of *Plasmodium lophurae* mixed with a Bacterial Toxin *Amer J Trop Med* 1943 No 23 No 6 597-606 3 figs [14 refs]

Previous laboratory work on the subject of immunity in malaria indicates that the host elaborates certain kinds of defence against

infection Under the heading of species specific immunity the following types may be recognized —

- 1 Cellular immune defences the macrophage system
- 2 Humoral immune bodies passive immunity
- 3 Agglutinins one element of humoral antibodies
- 4 Specific absorption of immune bodies by parasites

Under the heading group specific antibodies are —

- 1 Precipitins
- 2 Complement fixing antibodies

It is noteworthy that the immune phenomena of the first group are concerned with protection and that they are the result of the interaction of whole parasites or their water insoluble residues while those of the second group are caused by the water soluble material extractable from the parasites

A further examination of available data indicates that the antigen which gives rise to protective antibodies has the following properties —

- 1 It is an inefficient stimulus to antibody formation
- 2 It reacts readily with protective antibodies
- 3 It is insoluble in ordinary aqueous media

It would thus appear that the antigen is a partial antigen or hapten. In favour of this view are the difficulty experienced by the host in bringing the primary malarial attack under control and the tendency to relapse. These features are readily explained by the ineffectiveness of the antigen and the readiness with which the parasites combine with such antibodies as are formed. Added to these obstacles to the development of a satisfactory humoral immunity is the fact that for the greater part of its existence the malarial parasite is growing within the red blood corpuscle where it is protected from adverse humoral influences.

In the experiments reported in this paper antigen material was prepared from red blood corpuscles of ducks infected with *Plasmodium lophurae* by the addition of saline sucrose and protamine sulphate. Finally the sediment of black malarial material was washed several times in saline and stored in saline containing one half per cent phenol. Ducks receiving 0.5 cc. of a heavy suspension of the protamine plasmodial precipitate 20 or 10 days before an infecting dose of parasites showed a survival beyond the 20 days limit of survival of unvaccinated controls. Aqueous extracts of this material gave no protection though the insoluble residue left over after exhaustive aqueous extraction with ball mill grinding gave a similar protection. The protective action of this insoluble residue administered in five doses on the 19th to the 3rd day before the injection of the infective dose of parasites was definitely increased when a quantity of staphylococcus toxoid was added to each dose just before administration. The results of these experiments are in agreement with the hypothesis that the useful malarial antigens are of the nature of insoluble haptens.

C M Wenyon

TRYPANOSOMIASIS

TANGANYIKA TERRITORY DEPARTMENT OF TSETSE RESEARCH The Activities of the Department of Tsetse Research Tanganyika Territory since 1936 27 mimeographed pp With 3 appendices in d

The present report is a continuation of its predecessor the Tsetse Research Report 1935-1938 [this *Bulletin* 1941 v 38 73] but includes a review of the work of those years as well as the more recent researches [Reference to SWYNVERTON's volume *The Tsetse Flies of East Africa* 1936 is of great assistance in understanding this difficult and complex subject see this *Bulletin* 1937 v 34 363]. A seven years programme of research was begun in April 1938 when grants of £708 000 from the Colonial Development Fund and £35 000 from the Tanganyika Government had been made. A meeting of officials—administrative officers and representative of the agricultural veterinary and medical departments—whose duties were closely associated with the tsetse infested areas was held at Tabora in 1937 and a programme of 19 schemes of investigation was approved. In June 1938 C F M SWYNVERTON and B D BLITT botanist were killed in a flying accident and H L HORNBY the Director of the Veterinary Department became Director of Tsetse Research. The outbreak of war caused a great reduction in the staff and the closing down of some of the schemes.

This report deals with the study of six of the eight species of *Glossina* known to exist in Tanganyika Territory viz *G morsitans* *G swynnertonii* *G pallidipes* *G brevipalpis* *G austeni* and *G palpalis* var *fuscipes* each is considered separately.

In this work a close study has been made of the physiology and habits of the various species and of their environment—the vegetation atmospheric conditions soil enemies food supply etc and laboratory and field experiments have been carried out. The workers have critically examined the results obtained and discussed their meaning and importance.

G morsitans—C H JACKSON studied the fly population in an area of several square miles at Kakoma about 70 miles south of Tabora. Captured flies were marked with paint according to a special method [this *Bulletin* 1937 v 34 39] and released and from the proportion of recaptured marked flies he was able to estimate the size of the local fly population. The accuracy of the other method of estimating the numbers by the catches on fly rounds was confirmed—a catch of one old male fly per 10 000 linear yards represented a real density of about 7 or 8 old males per square mile. JACKSON also found that the male flies keep within an area of about one mile in diameter throughout their lives except that there is a slow outward drift of flies which escape and establish themselves in other localities or habitats. The mean duration of life of the male fly is about four weeks while females live considerably longer in nature. Studies on breeding showed that even in the dry season over 90 per cent of the pupae are scattered singly outside the recognized breeding sites.

Ants chiefly of the genus *Pheidole* destroy pupae and this may possibly be facilitated by prevention of grass burning since such fire exclusion was found to be followed by a considerable increase in the fly population.

Early burning of grass is followed by increased density of the vegetation in experiment of this kind at Abercorn in Northern Rhodesia gave disappointing results and was abandoned.

The report states that the war has interfered more seriously with the work on *G. morsitans* than with that on any other species. Discriminative clearing experiments should be made in several different types of *G. morsitans* country and a fire-excluding experiment in typical Tanganyika miombo wooding should be begun again.

G. swynnertoni—From his observations at Shinyanga JACKSON concluded that this species has a greater tendency to disperse than *G. morsitans*. Fire-exclusion experiments have been in progress for several years at Shinyanga and were described and discussed in the previous report by W. H. POTTS senior entomologist. He concluded that the considerable reduction in the fly population that occurred although intensified by a succession of years unfavourable to the fly would still have taken place without climatic help. NAPIER BAX made experiments on the senses of smell and sight of *G. swynnertoni*. It reacted to the scent of oxen up to a distance of 180 feet but not at 300 feet. It was also attracted to the flies but to a less degree. Black oxen were seen by the flies at 450 feet but not at 600 feet. Noise did not affect the flies. Physiological observations on the effects of the dry season, the heat of the sun and of the fly's activity were made by VANDERPLANK. POTTS and LLOYD respectively and POTTS and VANDERPLANK carried out preliminary experiments on phototropism of *G. swynnertoni* and *G. morsitans* on the lines described by JACK and WILLIAMS [this Bulletin 1938 v 35 338].

During the latter part of the rainy season *G. swynnertoni* seems to concentrate in the 'hard pan' type of country but in the dry season it spreads out and becomes more evenly distributed.

Observations were made to determine whether the movements of herds of game are important in the spread of tsetse flies and in affecting the numbers of flies caught from time to time. JACKSON concluded that the passing of game (or cattle) through an area does not materially affect the numbers of flies caught afterwards.

Dissections of *G. swynnertoni* and *G. pallidipes* showed no statistically significant differences between the infections of males and females or between *G. swynnertoni* and *G. pallidipes* in regard to infections with *Trypanosoma brucei*, *T. congolense*, *T. vivax* or total infections.

It was found that a thicket barrier about 2½ miles long, two thirds of which was formed by *Euphorbia tirucalli* 100 yards deep and the remaining third of its length by fire excluded deciduous thicket 300 yards deep impeded the passage of *G. swynnertoni* but by no means formed a complete barrier. About three times as many marked flies were caught on the side of the barrier on which they had been marked and released as on the opposite side. The passage of game through the barrier is thought to have aided the passage of the flies.

Fire exclusion reduced the number of *G. swynnertoni* and caused them to concentrate in limited short grassed areas but in favourable years their numbers again increased. The trees and thickets in these short grassed ('hard pan') areas were therefore felled and this resulted in a reduction from large numbers to very few flies. The females however were still fertilized in normal proportions. It has not yet been determined in what way this clearing of trees and thickets caused the reduction.

Some observations on game made with powerful field glasses showed that giraffe and wart hog were attacked by the flies but zebra were not and the precipitin test confirmed the latter observation.

G. pallidipes—This species an important transmitter of infection to cattle is thought to be much less attracted to man the flies being caught on man only when numerous and when external conditions are severe. Both MCGGRIDGE at Kilifi in the coastal area of Kenya Colony and VANDERPLANK at Shuyanya found that the flies were most numerous in the wet season. Observations on the effect of temperature and atmospheric humidity were made at both places. *G. pallidipes* is found in various surroundings but appears to be especially associated with and to some extent dependent on thicket.

G. brevipalpis—Comparatively few observations were made on this species of tsetse fly. It was found more in miombo forest than in dense thicket. It has crepuscular feeding habits but feeds very little at night even in moonlight.

G. austeni—MCGGRIDGE studied this fly at Kilifi under Kenya coastal conditions. Heat and a dry atmosphere greatly lowered its activity and compelled it to feed in the early morning and at night. It is thought that it finds its food at night by its sense of smell since ELTRINGHAM showed that its eyes were not specially adapted for night vision. It deposits its larva near fallen logs and probably not outside such sites to any great extent. It was found in both miombo forest and in thicket but seems to prefer thicket and shows no tendency to spread into more open vegetation in the wet season.

G. palpalis var *fiscipes*—Observations on this species were made by LLOYD and GLAGOW during trapping and clearing experiments. Lloyd found that traps caught about 1½% per cent of the estimated old male population per day at the end of the dry season. Three pairs of boys however can hit 10 times as many male flies as 66 traps did. The flies fed more on reptiles than on mammals and birds even when the latter were plentiful.

Clearing of the vegetation to a depth of about 100 feet from the water sedge caused a great reduction in the number of flies though it did not interfere with their food supply and they still bred in the inland thicket.

The laboratory—In the previous report POTTS FORD and VANDERPLANK described laboratory investigation including some work which could equally well be called field research. Identification of the kind of blood found in the tsetse flies had been made formerly by the precipitin test and by measurement of the red blood corpuscles. Both methods lack precision as they identify groups of animals rather than species. VANDERPLANK has introduced an agglutination test in which the blood in the fly is tested against a number of different animal sera. The serum with which no agglutination occurs indicates the source of the blood. The chief difficulty was the collection of sterile blood from wild animals for the preparation of the test sera. The results were promising but owing to certain difficulties which have not yet been overcome the test has not been much used.

Other laboratory work included research on the following: rearing tsetse flies in the laboratory; the effect of oil paints on the fly; fertilization of females; the times of day of deposition of larvae and of emergence from pupae; the relation of the weight of the pupa to its vitality; the duration of pregnancy in the field; parasitization of pupae of *Glossina* by *Bombylids*.

Appendices give lists of tribal reclamation work of the 19 schemes of the seven years programme of the publications by the research staff and of conferences attended in connexion with the work *J F Corson*

CHORLEY J K Tsetse Fly Operations, 1942 Short Survey of the Operations by Districts for the Year ending December 1942 Reprinted from *Rhodesia Agric J* 1943 May-June v 40 No 3 174-7 also as *Bull Ministry Agric* [Southern Rhodesia] No 1232 1943 4 pp

During 1942 two important discoveries were made A very heavy concentration of *Glossina morsitans* was found in Portuguese territory on the Busi River about 6 miles from the border and east of Chipinga it was not surprising as the steady westward spread of this fly has been observed for several years [this *Bulletin* 1944 v 41 269] The other event was the discovery of *G pallidipes* in the north eastern part of the Wankie district and in the south western corner of the Sebungwe district hitherto it had been thought that *G morsitans* was the only tsetse fly in the northern fly belt The area involved is known to be several hundred square miles but it must be assumed that a far greater area is infested

Two cases of human trypanosomiasis were found near Chirunde on the Zambesi River in the Lomagundi district they are the first cases recorded from the Lomagundi fly belt

The position in the various areas—Darwin Urungwe Lomagundi SW Gatooma Sebungwe Melsetter and Sabi Valley—is briefly reported In the Melsetter (Eastern Border) area there were more cases of animal trypanosomiasis than in any previous year 329 cases being diagnosed by blood smears the disease was also more widespread involving 38 farms

A total of 25 tsetse (16 *G pallidipes* and 9 *G brevipalpis*) were caught on the Southern Rhodesia side of the border *J F Corson*

BAA S N A Practical Policy for Tsetse Reclamation and Field Experiment Reprinted from *East African Agric J* Nairobi 1944 v 9 1-23 8 figs on 4 pls & 1 folding map [11 refs]

By reclamation the author means measures taken to free land from tsetse flies or to protect land from invasion by them The associated questions of anti erosion measures provision of water control of grazing &c are not dealt with though their importance in reclamation of land is fully recognized About 1 000 square miles have been freed from tsetse flies in Tanganyika Territory during the last 20 years but in the same period thousands of square miles have become infested In this paper the tsetse situations which can be remedied are described and the author says that the time has come when the knowledge gained by research should be applied The goal to be aimed at—the ability to reclaim cheaply any kind of country from any species of tsetse—has not yet been attained but a great advance has been made in the last 10 years and the whole conception and emphasis of tsetse reclamation is changing

It is estimated that about 4½ million square miles of the African continent are infested with tsetse in Tanganyika Territory about two-thirds to three quarters of the country is infested in Kenya Colony about one seventh and in Uganda about one fifth The problem is

complicated by the fact that there are ten species of *Glossina* in East Africa of which four *G morsitans*, *G styxneri*, *G pallidipes* and *G palpalis* are the most important each has its own mode of life special habits and surroundings. The author describes various tsetse situations and what should be done to remedy them.

Co-lact-be-en cultivation steppe and fly-bush—[Cultivation steppe is defined as an open area under sufficiently close human occupation agricultural or agricultural and pastoral to have been cleared of the greater proportion of its natural woody vegetation.] There are many causes of an advance of tsetse into cultivated land the land may become worn out and so deserted the population leaves an unpopular chief water supplies fail wild animals become too troublesome &c. In addition to a gradual advance the fly is also able to leap forward several miles at once in certain circumstances e.g. over rocky land abandoned land or land not fully occupied. For these conditions the author advocates the formation of defence lines of cleared boundaries in which the bush is cut back and cleared.

The thorn savanna infested with G styxneri—Discriminative clearing alone has been found effective for this situation. The tsetse fly requires a concurrence of different types of vegetation and it was found that cutting down the easily felled vegetation of the hard pan areas was sufficient to produce practical elimination of the tsetse. In the Ukerewe peninsula on Lake Victoria the clearing of 4 600 acres of hard pan rendered 70 500 acres (118 square miles) almost clear of tsetse and of sleeping sickness. Where areas of cultivated land or of other tsetse-free land are separated from one another by bands of fly-infested bush of moderate width discriminative clearing of the latter may be applied with success.

Thorn savanna and miombo wood infested by G pallidipes—Here it is recommended to remove the thicket on which this species is dependent.

The great plains carrying a lace work of vegetation infested by G styxneri and morsitans—In the gall-acacia plains it is recommended to make a clearing a mile wide along the edge of the thorn bush thereby forming a barrier between it and the plains and to fell any small islands of bush in the plains this should be followed by the provision of water tanks to encourage cattle owners to settle there. These measures have been successful in reclaiming 160 000 acres (the Huru-huru plains) near Shinyanga. The maintenance cost is estimated at 1/50 man-day labour per acre per annum. A somewhat similar method is recommended for dealing with plains carrying other types of vegetation discriminative clearing should be done under the direction of an experienced flier.

The linear habits of the palidipes G brevipalpis G austeni and G palpalis—The first three species are dependent especially in the dry season on the shade of bushes along rivers and drainage lines the other species *G palpalis* haunts the borders of lakes and rivers. The remedy in the case of the first three species is cutting out the undergrowth leaving only the large lean stemmed trees. In the case of *G palpalis* the author says foreshore and river clearings will kill out *G palpalis*. SYMES and VANE [this Bulletin 1937 v. 34 p. 42] have shown in Kenya that *G palpalis* can be so reduced in numbers by the block method of clearing as to make human occupation safe this method is much cheaper than beer clearing.

Small villages isolated in the great expanse of the tsetse bush—This situation has been dealt with by the Medical Department of Tanganyika Territory by forming settlements of people [this *Bulletin* 1944 v 41 12]

Tsetse in and around towns—During the years when farm land is lying fallow the bush regenerates and a thicket suitable for *G pallidipes* grows up this has occurred round Dar es Salaam and Tanga in Tanganyika Territory *G brevipalpis* and *G austeni* commonly occur with *G pallidipes* and are eliminated by the same measures The thickets should be cut out leaving the large trees

Alienated land—The measures to be adopted will depend on the local conditions cooperation by the owners of the land advice by an expert and supporting legislation will be required

Two other methods of reclamation—organized grass fires and isolation of special vegetational areas by cleared barriers—may be mentioned but are not emphasized the former is regarded as a subordinate measure to be used in certain conditions while the latter needs very wide barriers which are costly to maintain

The prospect for large scale reclamation—Reclamation of areas of over 50 square miles can be successfully undertaken in some regions e.g. the great plains of the hard pan *Acacia Commiphora* country Cheap discriminative clearing has been recommended for an area of over 500 square miles at Arusha in Tanganyika Territory to free it from *G swynnertoni* and *G pallidipes* while in the Musoma District of Tanganyika Territory there is a great island area of 300 square miles which has been surveyed and which the author says can undoubtedly be reclaimed cheaply from *G swynnertoni* *G pallidipes* and *G brevipalpis* There are several thousand square miles of Tanganyika Territory which can be reclaimed at a cheap cost by methods already known to the Department There remain enormous areas of miombo country infested by *G morsitans* great areas of thorn bush with *G swynnertoni* and the vast *G pallidipes* country

The author gives a résumé of the large scale experiments financed by the Colonial Development Fund which have been so seriously interfered with by the war A combination of fire-exclusion and discriminative clearing of the hard pan in Shinyanga gave very good results and a similar experiment has been made in Northern Rhodesia Merely clearing a special type of valley in Northern Rhodesia without fire exclusion or organized burning caused a large reduction in the number of *G morsitans*

The effect of selective clearing on *G swynnertoni* is being tested but results are not yet available The author distinguishes between discriminative and selective clearing the former means the removal of a definite type of vegetation comprising different species e.g. hard pan clearing while the latter refers to the removal of certain species of trees throughout the bush in whatsoever type of vegetation they may occur and results in the reduction of the vegetation to one or more species of trees left uncut

An experiment with discriminative clearing of thicket to test the effect on *G pallidipes* is being made at Shinyanga in an area of 3 700 acres of *Acacia Commiphora* savanna Other work is being done in *Isobertinia Brachystegia Acacia Combretum* savanna In a small experiment by MCGGRIDGE at Kilifi cutting out the undergrowth from 100 acres of coastal thicket greatly reduced the numbers of *G pallidipes*

Reclamation by shooting the game—A large scale game experiment was begun by the Tsetse Department but had to be closed down when war broke out. In Southern Rhodesia the shooting of game has been proved to be very effective but the author states that it certainly cannot be applied everywhere owing to the topography of the country and the density of the bush. It may well play an important part in reclamation in East Africa.

Defence—The cleared barrier of sufficient width is too difficult to maintain to be a practical measure except in special circumstances. Discriminative clearing perhaps combined with fire exclusion may well provide the defence of the future and its study should be taken up again after the war.

The author thinks that the Diesel-engined caterpillar tractor should be very useful in places where population is sparse.

The international aspect of reclamation, the natural barriers like the Great Lakes, mountainous areas, great plains and cultivated areas are discussed and the author concludes that although in Tanganyika Territory the problem is much more difficult than in Southern Rhodesia the successful operations in the latter territory are on such a large scale that they give confidence that improved methods of research will enable the Tanganyika problem to be tackled with equal success even in the southern part of the Territory. In the northern part, the Lake and Northern Provinces, he thinks that a complete survey would show that thousands of square miles could be reclaimed by present methods.

The author discusses certain other views which have been given from time to time, that sheer felling of vegetation as required by the population is sufficient, that tsetse flies are a blessing in disguise by protecting the soil from erosion. Finally, he refers to the organization necessary to carry out a tsetse policy and suggests the formation of a territorial tsetse committee composed of the Chief Secretary and the Directors of the Medical, Agricultural, Veterinary and Tsetse Departments. Provincial sub-committees would also be formed. [In the abstracter's opinion this paper is a very important one representing the view of a team of scientific workers who have closely studied the problems for many years.]

J. F. Corson

- 1421 HOOF L. HENRIARD C. & PEEL E. Re behav sur l comporte ment du Trypanosoma gambiense dans l'espèce [Behaviour of *T. gambiense* in the Domestic Pig]. *Ann. Soc. Bel. de Méd. Trop.* 1940 Jun 30 0 3-6

This paper is a duplicate of that abstracted in this Bulletin 1943 40 367

- 1422 HOOF L. HENRIARD C. & PEEL E. Irrégularités de la transmission du Trypanosoma gambiense par les G. palpalis [Irregularities in the Transmission of *T. gambiense* by *G. palpalis*]. *Ann. Soc. Bel. de Méd. Trop.* 1940 June 30 0 3-6 7-43 [16 f.]

This paper is a duplicate of that abstracted in this Bulletin 1943 40 368

- McCOMAS C. & MARTIN V. H. Trypanosomiasis treated with Pentamidine: a Fatal Case. *Lancet* 1944 Mar 11 338-9

The patient was an African soldier of the Gold Coast West Africa Regiment. He was admitted to hospital on February 26th 1943 complaining of malaise and headache of three days duration on admission.

he was observed to be somnolent. Trypanosomes were found in a blood film and his cerebrospinal fluid contained 170 leucocytes per cmm. He was given three injections [presumably intravenous] of 0.1 gm of pentamidine—the first on March 10th the second on March 11th and the third on March 13th. After each of the first two injections he complained of pain in the left temporal region lasting for about two minutes. 10 minutes after the third injection he became unconscious and passed into status epilepticus. There was strabismus but his pupils were equal and reacted to light. Examination of the eyes on March 18th showed bilateral papilloedema. Soon after the fits began his temperature rose and remained between 102° and 103° F until he died on March 27th. His cerebrospinal fluid on March 18th contained 190 cells per cmm, 90 per cent being lymphocytes and 0.04 per cent of protein. On March 25th it contained 230 cells and 0.06 per cent protein. No trypanosomes were seen.

An autopsy was made within an hour after his death. Sections of the brain showed widespread perivascular cuffing conforming to MOTT'S description [*Rep. Sleeping Sickness Comm. Roy. Soc.* No 7 1906]. The myocardium was apparently normal.

The authors think that the status epilepticus was caused by the drug either by direct action on the central nervous system or from a Herxheimer reaction, the latter being more probable. [The somnolence on admission, the condition of the cerebrospinal fluid and the widespread perivascular cuffing suggest an infection of at least several months' duration. For other references to the use of pentamidine in human trypanosomiasis see this *Bulletin* 1943 v 40 224 370 589 1942 v 39 532.]

J. F. Corson

DEWISON, Nadene. Experimental Studies on *Trypanosoma cruzi* Infection and Reticulo-Endothelial Blockade in Rats. *Amer. J. Hyg.* 1943 Sept. v 38 No 2 178-84

Since the intracellular stages of development of *T. cruzi* are located chiefly within the macrophages, experiments were conducted with the view of comparing experimental *T. cruzi* infection in rats with mechanical blocking of their reticulo-endothelial system by trypan blue. In addition to these, in another batch of animals the trypanosome infection was superimposed upon the RES block. In all cases the infection—produced by a culture (in NNN medium) of trypanosomes of the same strain—was transient and the animals were kept under identical conditions.

It was found that the changes in body weight were slight and there was no significant difference among the three groups of animals as regards the percentage of body weight represented by the liver, spleen or heart. The differential blood counts showed a significant variation from the normal, which was similar in all the three groups of rats. The blood picture was characteristic of a chronic infection, with a slight leucopenia, moderate lymphocytosis and monocytosis. The blood serum of the infected animals was trypanolytic to cultures of *T. cruzi* in a dilution of one in five. In rats which were blocked as well, the time required to produce lysis was increased and the titre of the serum was reduced.

C. A. Hoare

Dios R L & Bonacci H Sensibilidad de los sapos (*Bufo arenarum*) a la inoculación experimental del *Trypanosoma cruzi* Segunda comunicación
 Infection with *T. cruzi* [Re Inst Bacteriol Dec 12 No 1 27-36]
 Malbrun Buenos Aires 1943
 2 fold in pls Enlish summary

1 We inoculated experimentally 1040 toads of the species *Bufo arenarum* with strains of *Trypanosoma cruzi* of diverse origins human and infected *Triatoma infestans*

2 We used 1336 white mice and also 5 pups

3 The culture tubes used as checks amounted to 783 (culture media of Noguchi and Bonacci)

4 Every toad inoculated with the different strains of *T. cruzi* remained negative. On the other hand the sensitive animals and the cultures utilized as checks were constantly positive

5 These large scale experiments prove definitely that the toad (*B. arenarum*) is not susceptible to the experimental inoculation of *T. cruzi*

MEYER H Culturas de tecido nervoso infectadas por *Schizotritpanum cruzi* (Cultivation of *T. cruzi* from Infected Nervous Tissue)
 Anais Acad Brasileira de Ciencias Rio de Janeiro 1942 Sept 30
 14 No 3 23-6 4 figs on 2 pls English summary

Cultures of brain and spinal ganglia of chicken embryos were infected with *S. cruzi*. The nerve cells become infected like the other cell of the nerve tissue. Nerve cells support parasites well up to the third day of infection. Thereafter when the parasites are beginning to move, signs of structural disintegration are observed. The neurofibrillae are destroyed, the nerve fibre gives no further reaction with nitrate of silver. The nerve cell finally bursts and the new parasites are free to leave the cell.

LEISHMANIASIS

DAS GUPTA C R & SEN GUPTA P C Agranulocytosis in Kala Azar
 Indian Med Gaz 1943 Jan 1 78 No 1 8-11 5 figs (1 coloured)
 on 2 pls [10 refs]

Though acute agranulocytosis as a complication of kala azar is of fairly frequent occurrence in North China Hwang having reported in 1942 that there had been 47 cases in a series of 554 proved cases of kala azar admitted to the hospital of the Peiping Union Medical College during a period of 10 years the condition has rarely been reported from other kala azar areas. Thus amongst several thousand cases of kala azar treated during the same period at the Calcutta School of Tropical Medicine no single case of this complication had been observed till the subject of the present paper was encountered. The patient was a Hindu female child 11 years of age. There had been a history of fever of four months duration and finally a four days inability to swallow. Examination of the mouth showed a coated tongue sore at the margins

and congestion of the pharynx and tonsils. The cervical glands were enlarged. A blood count showed 750 white cells per cmm with complete absence of neutrophils. There were 600 lymphocytes, 75 plasma cells, 60 preplasmacytes and 825 large mononuclears. The aldehyde test being positive a sternal puncture was carried out and leishmaniasis demonstrated. In spite of treatment with pentnucleotide and intravenous glucose there was no improvement, death supervening a week after admission to hospital.

The bone marrow in this case conformed neither to agranulocytosis nor kala azar. In the latter condition in India, though the total nucleated cell count differs little from that in normal persons, the proportion of white cells is below normal owing to a decrease of the granulocytes while there is an increase in the red cell series. There is also an increase in plasma cells. In the present case the marrow was neither normal nor hyperplastic but appeared to be definitely hypoplastic, the total nucleated cell count being only 16 000 per cmm. The increase in the lymphocyte and plasmacyte series was greater than in either of the diseases alone. In addition to the reduction in the granulocytes there was also a reduction of the erythropoietic cells. It is concluded that the unusual character of the marrow was the result of the coexistence of the two pathological conditions, kala azar and agranulocytic angina. [See also this *Bulletin* 1942 v 39 608]

C M Wennyon

BURKE E. Notes on the Control of Kala Azar on Tea Estates. *Indian Med Ga* 1943 Jan v 78 No 1 20-26 2 graphs

The author writes of his 15 years' experience of the control of kala azar in two large tea districts in Assam (East Boroi and Mangaldai). The Mangaldai district, which is chiefly dealt with, has an area of about 150 square miles. In this area are 14 estates with a combined area of 9 708 acres and an average population of 26 000. One of the chief methods of control of kala azar is the early identification of every case, isolation and treatment of the patient, followed by a careful watch on contacts for the first signs of infection. During the latter half of the period of the author's service (1935-1942) 3 489 cases of kala azar were treated, 80 per cent with neostibosan and the rest with urea stibamine or solustibosan. Of the total only 190 died of intercurrent infections or failure to respond to treatment. Constant mass surveys were carried out by inspections and general applications of the aldehyde test. Whenever cases were identified the patients were removed to hospital for treatment and the contacts thoroughly investigated. If a serious outbreak occurred it might be necessary to burn the infected lines. Spraying of the habitations and of any surrounding uncleared bush with a view to destroying the sandfly vector was regularly undertaken. Cultivation of cleared areas is a potent method of sandfly control so that establishment of gardens was always encouraged. New labourers were carefully examined before engagement and certain castes, which experience had shown to be quite unsuitable for work on tea estates, were never employed. Care had to be taken that previously employed coolies suffering from kala azar did not return under an alias. The author's conclusion after his discussion, which is largely of local rather than of general interest, is that the policy he advocates has been successful in controlling kala azar in a crowded potential reservoir of infection so that the disease has been kept down to the low average of 355 cases per annum.

C M Wennyon

SACHDEVA Y V Treatment of Oriental Sore with Quinacrine *Indian Med Ga* 1943 Jan v 78 No 1 19-20

At the Mayo Hospital Lahore where oriental sore is fairly frequently encountered the author has tried the atebryn infiltration treatment as recommended by FLARER [this *Bulletin* 1939 v 36 454]. Atebrin not being available quinacrine was employed in the treatment of 57 cases in 55 of which leishmania were demonstrated.

For a single sore 0.1 gm. in 1 cc. of distilled water was used while for large sores or when several were present 0.3 or 0.4 gm. in 3 or 4 cc. was used. The injections which are somewhat painful are made intradermally with a dental syringe in several places round the sore till it is completely infiltrated. To effect a cure one treatment may be sufficient in some cases but in others from two to five treatments at weekly intervals may be necessary. There is little pain after the injections which are not followed by any inflammatory reaction. The treatment is especially useful for sores on the eyelid and lips or other parts of the face where other forms of treatment are contraindicated. There is no scarring with non-ulcerating sores and only slight scarring with those in which ulceration has occurred. C. M. Nelson

KIKUTH W Quimioterapia de la leishmaniasis [Chemotherapy of Leishmaniasis] *Med Colonial* Madrid 1943 Aug 1 v 2 No 2 101-13

FEVERS OF THE TYPHUS GROUP

DE LA LASTRA SOUBRIER J M Las variantes O de las razas λ de proteus en la reaccion de Weil Felix [Variability of the O Strains of *Proteus* λ used in the Weil Felix Reaction] *Med Colonial* Madrid 1944 Jan 1 v 3 No 1 13-18

The author has already shown that in plate cultures of O strains of *Proteus* $\lambda 1$, λA and $\lambda 2$ colonies are occasionally found which have the appearance and properties of H strains. He also showed that there are flagellar antigens which are common to $\lambda 1$, λA and $\lambda 2$.

Even in non-motile O strains flagella can sometimes be demonstrated and by a series of selective subcultures of such strains it is easy to obtain typical H colonies.

By continued subcultures for four months of O $\lambda 1$, O λA and O $\lambda 2$ motile strains have been found to develop even though special selection of the colonies was omitted. The change to the H type was most pronounced in the case of O λA and least pronounced in O $\lambda 1$. While this change was occurring some of the cultures retained their O characteristics of non-motility and a very slight tendency to the formation of flagellar antigens.

By careful selection of typical O colonies it is possible to maintain strains suitable for the Weil Felix reaction. The cultures are best made on solid media incubated at 37 C for 24 hours and then kept in the cold. The media should not contain carbohydrates fermentable by the organisms. The use of weak antiseptics such as phenol 1-1000 for the inhibition of H colonies is not recommended.

The Weil Felix reaction is much more reliable when perfectly pure O strains are used with them the reaction to OX2 is uniformly negative in typhus exanthematicus of the classical type and false positives with OX19 are much fewer

Killed suspensions of O strains are quite suitable but they must not be preserved in formal phenol is suitable and alcohol used in the customary way destroys the flagellar antigens *John W D Measow*

PARA J H & OFFENBANTZ F M Immunologic Reactions following Typhus Vaccination in Army Personnel *J Lab & Clin Med* 1943 Dec v 28 No 15 1859-63

The Weil Felix test was carried out in four groups of persons in the South West Pacific area Their responses to *Proteus* OX19 and Pr OXA are summarised in the Table

The positives group consisted of patients diagnosed as mite borne scrub typhus the civilians group was made up of 36 civilians who were natives of the area and 10 members of the Merchant Marine the officer candidate and patients groups were American personnel who had been vaccinated within the previous year with Cox's yolk sac vaccine made from *Rickettsia prowazekii* The patients were under treatment for malaria syphilis or dengue the officer candidates were healthy

Reactions to *Proteus* OX19 and Pr OXA

Titres to OX19	Positives	Civilians	Officer Cand	Patients
0	12	44	124	254
1-10 to 1-20	15	2	22	25
1-40	7	0	0	0
1-80	1	0	0	0
1-160	1	0	0	0
Total	36	46	146	279
Titres to OXA				
0	0	36	22	72
1-10 to 1-20	0	9	116	178
1-40	0	1	8	23
1-80	0	0	0	6
1-160 to 1-1280	36	0	0	0
Total	36	46	146	279

In the civilians group the 10 who gave low titre reactions with OXA including two who reacted 1-10 to OX19 were members of the Merchant Marine all the 36 native civilians were completely negative to both organisms

In the group of positives who were diagnosed as scrub typhus on clinical and serological grounds only one reacted to OX19 at a titre of 1-160 his reaction to OXA was at the same titre

The chief conclusions were (1) Among persons vaccinated within the preceding 12 months (55 per cent of these about six months before the test) 88 per cent were completely negative to OX19

(2) it was perplexing to find that 80 per cent. of these persons reacted to OVA (3) Of the OVA reactions 86 per cent. were at a titre of 1-20 1-10 or negative from this we concluded that a titre of 1-40 was very suspicious and 1-80 diagnostic of scrub typhus. (4) The Rickettsiae used in making the vaccine were probably capable of inciting antibody response against OVA and presumably of conferring some degree of immunity against scrub typhus

The authors state that the term typhus as generally used refer to three groups of Rickettsial fevers (1) louse-borne and flea borne classical typhus (2) tick borne Rocky Mountain spotted fever and (3) mite-borne scrub typhus and tsutsuamushi fever

The inclusion of the tick borne and mite-borne fevers in the typhus group is a welcome sign that some workers from the U.S.A. are prepared to recognize the suitability of the name typhus for these two Rickettsial fevers and so to conform to the practice prevailing in other parts of the world. But flea borne typhus is not generally regarded as classical typhus and scrub typhus and tsutsuamushi fever are now considered to be the same disease.

The author finds as are in some respects perplexing unless due allowance is made for variations in the agglutinability of different strains of the *Proteus* organisms and for the fact that the Weil Felix reaction cannot be regarded as truly specific in spite of its great value in diagnosis.

John W. D. Megaw

GAALE Titterschwankungen der Proteus OVA Agglutination nach Weil Felix I Beobachtungen von Titterschwankungen innerhalb von Tagen und Stunden bei Fleckfieberkranken und Rekonvaleszenten [Fluctuations in the Agglutination Titre of *Proteus* OVA in the Weil-Felix Reaction] *Ztsch f Immunitätsf u Exper Therap* 1943 Aug 10 v 103 No 4 27-8 29 figs

The Weil Felix reaction is recognized as being a non specific antigen antibody reaction which may remain positive for many years

The Weil Felix titre of 13 persons convalescent from typhus were observed at five-day intervals for several months. In 65 per cent of these there were great fluctuations which when shown as graphs resembled the temperature curves of septic patients with deeply remittent or even intermittent types of fever

So also 67 per cent of the sera of 46 typhus patients tested from the onset of the illness showed even greater fluctuations in the titre instead of the gradual rise and steady fall that might have been expected

In one extreme example the titre was 1-400 on the 4th day it fell to about 1-20 on the 6th and rose to 1-6 400 on the 8th day. In another it was 0 on the 3rd day 1-6 400 on the 8th 1-200 on the 10th and 1-12 800 on the 11th day

The titre was usually though not invariably much higher after the night than two or three hours after a meal sometimes a strongly positive reaction in a fasting patient became negative after food the tendency of the titre to fall after food was most pronounced in convalescents.

Among the 160 mild and moderately severe cases studied in the investigation there were 9 (5.6 per cent) who gave negative responses throughout the whole period.

The importance of making repeated tests in fasting patient is stressed.

John W. D. Megaw

MEYER R Ueber das Verhalten von Citochol und Meinicke bei Fleckfieberschutzgeimpften (Weigl'scher Impfstoff) [The Citochol and Meinicke Reactions in Persons Vaccinated with Weigl's Typhus Vaccine] *Ztschr f Immunitätsf u Exper Therap* 1943 July 5 v 103 No 3 161-4

The author has already shown that the sera of typhus patients gave some response to the Citochol Test in 26.3 per cent of the cases and to the Meinicke R. R. II Test in 10.5 per cent. Only 4.5 per cent of the sera gave responses with both of these tests. In 2.4 per cent both reactions were doubtful (- to ++) and in 2 per cent there was a doubtful reaction to one of the tests and a definitely positive one (+++ to +++) to the other. In none of the 712 sera tested was the reaction definitely positive to both tests [see this *Bulletin* 1943 v 40 689].

In the present investigation 310 sera of persons inoculated from 5 days to 16 months previously were tested and were compared with the responses in 385 control sera. The results were —

	Inoculated	Controls
Doubtful positives to both tests	1.3 per cent	6.3 per cent
Doubtful positives Citochol only	16.4	15.6
Doubtful positives Meinicke only	5.8	6.5

The lapse of time after vaccination had no influence on the results. It was concluded that vaccination by Weigl's method did not affect the responses to either of the reactions.

Doubtful reactions were considerably more numerous among troops in the East than in the West. Climatic influences may have been responsible for this difference in the response.

John W. D. Megaw

BERRIO y CABA E. D. Algunas consideraciones sobre el empleo y resultados de la vacuna del Dr. Blanc contra el tifus exantemático [Observations on the Results of Vaccination against Typhus with Blanc's Vaccine] *Med Colonial* Madrid 1943 Aug 1 v 2 No 2 126-31

In July 1941 168 prisoners in Uad Lau in Spanish North Africa were vaccinated with Blanc's flea faeces vaccine. Only seven had local and febrile reactions lasting three to five days. No case of typhus occurred in the prison till 14 months later when 100 of the vaccinated persons were still in the prison and there were also 200 unvaccinated persons.

Five of the vaccinated prisoners were attacked and two of them died. There were six attacks with one death among the other 200 who had not been vaccinated. It appeared therefore that any protective value had been lost within 14 months.

In October 1942 before the outbreak had been controlled 272 prisoners who still remained in the prison were vaccinated by the same method. Only three had local and febrile reactions. No further cases occurred although conditions were regarded as being still favourable for the spread of infection. It is stated however that other measures had been taken including disinfestation and segregation of the sick.

and no mention is made of the dates of occurrence of the attacks prior to vaccination so that the evidence of the protective influence of the vaccine is not very convincing.

The authors state that more than one and a half million persons have been vaccinated by this method in French North Africa.

John W. D. Meade

ПРОГРЕСС НАУКИ И Исследования советских ученых в изучении
риккетсиозов [Advances in Soviet Research on the Rickettsias]
Zh Mikrobiol Moscow 1942 No 11 12 59-61 [Summary
taken from Ist Bull 1944 Apr 14 No 4 122. Signed
A. MOLDASOVA]

This is a discussion on the development of Soviet research on rickettsias. The chief work on epidemiology, histology of lesions, vaccination against *R. proxeckii* and cultivation of the organism is discussed.

There is also a short report on three rickettsial infections which have recently been recognized and investigated in the U.S.S.R. one of these occurs on the Black Sea coast and is probably identical with Marseille fever, the second was met with in the Far East Central Siberia and the Chabarovsk district and was identified as Malayan typhus type W, the third occurring on the Caucasian Black Sea shore was related to murine typhus.

MAILLARD E. R. & HAZEN E. L. A Second Report on Rocky Mountain Spotted Fever in New York State exclusive of New York City. New York State J of Med 1944 Jan 1 44 No 1 73-5 [13 refs]

In 1935 the authors reported 10 cases of Rocky Mountain spotted fever from one County in Long Island. Since then 6 cases have been diagnosed in Long Island which is the only known focus of the disease in New York State.

All the patients lived in rural areas. Cases occurred in spring, summer and autumn. There was a history of tick bite or contact with ticks in 24 of the 26 cases, but not infrequently the site of the bite could not be detected. The symptoms corresponded with those of Rocky Mountain spotted fever as described by RUMREICH this Bulletin 1933 1 30 899 and PARKER ibid 1938 1 35 800. Most of the cases were mild, but there were six deaths.

The maximum agglutination titres were as shown in the table—

Titre	1-160 or over	1-80 or under	Negative
<i>Proxus OX 19</i>	4	2	0
<i>Pr OX</i>	4	8	14
<i>Pr VA (O-HO reversal)</i>	0	0	26

In the first week the titres ranged from 0 to 1-80. Between the second and third week after onset titres of 1-160 to 1-2500 were

observed. The titre for O\2 was higher than that for O\19 in two of the cases. In one of these the titre for O\2 was 1-1 280 and for O\19 1-160 after two weeks of illness.

The O\2 and O\4 strains were obtained from the Lister Institute and the O\19 strain from Dr MOOSER. Alcohol treated suspensions were used.

The agglutination of O\2 by some of the sera helped to differentiate Rocky Mountain spotted fever from endemic (flea borne) typhus.

A total of 36 cases from Long Island has now been studied serologically since 1926 when presumably the disease was first recognized in that area. [See also this *Bulletin* 1936 v 33 47]

John H. D. Megaw

YELLOW FEVER

BUGHER J. C. BOSHELL MANRIQUE J. ROCA GARCIA M. & OSORIO-MESA L. Epidemiology of Jungle Yellow Fever in Eastern Colombia. *Amer J Hyg* 1944 Jan v 39 No 1 16-51 5 figs & 3 maps [21 refs]

The discovery of jungle yellow fever near the foothills of the Andes in Eastern Colombia in 1934 stimulated the Colombian Government in collaboration with the Rockefeller Foundation to set up a field laboratory in the village of Restrepo. As cases continued to appear in the area it was decided to establish a well-equipped virus laboratory to serve as a centre for epidemiological and laboratory investigations. The town of Villavicencio was chosen as the site and a suitable building was erected. This laboratory began operations in March of 1938 and has steadily functioned since. The data reported in this paper represent the results of intensive studies for a period of two years ending in January 1942.

As a result of previous studies techniques for animal and insect work had been elaborated, equipment designed and plans made for the transportation and setting up of mobile field laboratories on short notice. Fortunately six favourable opportunities for field studies developed within reach of Villavicencio during the period covered by this report. The time of the investigation and the area were determined by the discovery of a human case of yellow fever usually by the viscerotomy service. With a minimum of delay the field laboratory was set up at the probable site of infection of the known human case. In general the programme involved the capture of all living things that could be found in the area. These were roughly classified and combined in groups with the preservation of material for subsequent identification. In the case of arthropods and other insect groups specimens were triturated in normal monkey serum saline and the suspensions centrifuged. This material was inoculated intracerebrally into mice and subcutaneously into rhesus monkeys in the hope of isolating virus. The animals captured were bled at once to determine the possibility of circulating virus or of circulating antibodies. At first the investigations were made as comprehensive as possible but as experience accumulated attention was more and more confined to mosquitoes and to monkeys and marsupials.

In the course of these studies yellow fever virus was isolated 13 times from *Haema o us capricornis* and once from *Aedes leucocelaenus*. No virus was found in any other arthropod form. Transmission by bite to rhesus monkeys was obtained twice in groups of *Haema o us capricornis* found infected in nature. Numerous monkeys of different species and several species of marsupials were found to have specific antibodies in their sera. Some of the marsupials developed their antibodies in the month after their capture, indicating that their infections had been acquired just prior to capture. Occasionally other animals were found to be immune, but it appears that genera other than primates and marsupials play little rôle in the epidemiology of yellow fever in this region. No virus was found in mosquito larvae collected in the study areas.

Since *Haema o us* appeared to be of such importance in transmission of yellow fever, special attention was given to its study. *Haema o us* is a forest mosquito. Comparatively little is known of its breeding habits. Larvae in nature are found almost entirely in tree holes. Adults have been found several hundred metres from the nearest known breeding places, indicating that under certain conditions fairly long flights may be made. This mosquito is outstandingly arboreal and especially during the dry season it may be found only in the tree tops. Here it may persist throughout the dry season and infected mosquitoes may thus carry over virus into the next breeding season at the beginning of the rains.

On the basis of the information accumulated in this study the authors deduce the following explanation of the epidemiology of jungle yellow fever in Eastern Colombia. It is primarily a disease of jungle animals, the virus being transmitted from animal to animal by certain mosquitoes which are strictly forest inhabitants. The animal phase is exclusively mammalian and for practical purposes is confined to the primates and the marsupials, both of which are arboreal. The multiplication of virus and its circulation in the blood are transitory and persist for a few days only. Antibodies are produced, leaving a permanently immune animal. The jungle virus does not appear to produce any important illness in the susceptible animals. Ordinary movements of such animals are therefore not seriously impeded and their migrations can play a definite part in the spread of the virus. On the introduction of virus into a region which has no immune animals the outbreak may be explosive in character with the result that within a relatively short time nearly all the monkeys and opossums may be immunized and the epidemic in the area dies out. Under such conditions another outbreak cannot be expected for several years until a non-immune population is re-established. Where the susceptible animals multiply rapidly the animal outbreak may tend to be prolonged. This is particularly true in areas where marsupials produce two large litters a year. If no severe dry season occurs the virus may persist in such an environment over several rainy seasons, showing the characteristics of endemicity. Several other species of mosquitoes than *Haema o us* may at times play some part in the transmission of yellow fever in this area. Among these are *Aedes leucocelaenus*, *Aedes fluviatilis* and *Aedes scapularis*. Practically the essential vector appears to be *Haema o us capricornis*.

For the most part the human element in jungle yellow fever appears to be casual. It is particularly among the persons who disturb the

forest by clearing that the disease tends to occur. Where the human population is abundant *Haemagogus* may act as a vector from man to man.
Hugh H. Smith

BUGHER J. C. & SMITH H. H. Antigenicity of Yellow Fever Vaccine Virus (17D) following Fifty Seven Subcultures in Homologous Immune Serum. *Amer J Hyg* 1944 Jan v 39 No 1 52-7

The production of yellow fever vaccine (17D) was begun in the Laboratories of the Yellow Fever Service of Brazil in 1937 and during that year and in 1938 a highly successful campaign judged both by the mouse protection test results and by the sharp reduction in the incidence of yellow fever was carried out in which over 500 000 persons were inoculated with the cultured virus. The vaccines used throughout this period were prepared with virus from the 229th to 250th passage in tissue culture. However during the 1938-39 yellow fever season in southern Brazil both epidemiological observations and the post vaccination immunity survey showed serious failure of several lots of vaccine to protect. The 6 lots were all prepared from relatively high subculture passages—that is from the 305th to the 391st subcultures. Experimental work carried out in the Bogota Colombia laboratories demonstrated that high subcultures did not in themselves necessarily produce a loss of immunizing efficiency [see this *Bulletin* 1942 v 39 77]. The experimental lots of vaccine used in this study were from the 212th and the 450th subcultures greatly exceeding the range which was suspected of having produced difficulties in Brazil. Attention was therefore turned to other factors.

Customarily the 17D strain of virus is cultivated in a medium to which normal human serum has been added. The serum used is always a pool from donors whose sera have given clearly negative mouse protection tests. It has been shown that when human blood samples are taken in a yellow fever region an appreciable portion of the sera giving negative results when tested by the routine intraperitoneal method may be shown by a more sensitive test to contain weak but specific antibodies. Since the unsatisfactory lots of vaccine in Brazil were prepared from virus grown in cultures employing pools of human serum collected in a known yellow fever region it was considered highly probable that the virus had multiplied in contact with specific yellow fever antibodies and that this contact might have modified the virus strain so as to impair its antigenic value.

Beginning with material of the 236th subculture parallel series of cultures were maintained for 57 passages. The technique was the same for both with the exception that in one series a constant amount of immune human serum was added to each culture. The same pool of immune serum was used throughout sufficient to make 0.1 per cent concentration in the medium. This was found to be the maximum concentration which would allow satisfactory multiplication of the virus. At the 294th subculture lots of vaccine were prepared from each series. These were tested in human groups for their ability to produce antibodies under as nearly identical conditions as possible.

Groups of approximately 20 men whose sera had previously been shown to be free of demonstrable yellow fever antibodies were inoculated with serial dilutions of both the experimental lots of vaccine. The groups receiving the largest doses of virus were given a calculated dose of 10 000 M.L.D. for mice. The next groups 1 000 M.L.D. the

next 100 MLD and the last group 10 MLD. At the end of one month the men were bled a second time. Mouse protection tests on the sera showed no significant difference in the efficiency of immunization with the two lots of vaccine. There was little failure to immunize save in the last group which received approximately 10 MLD per person. These results are in agreement with previous conclusions that for satisfactory immunization of man by the 17D virus amounts equivalent to 100 MLD for mice or more must be used. It thus appears that cultivation of yellow fever virus in the presence of antibody barely insufficient to prevent multiplication does not produce any modification with respect to antigenicity in man as measured by the intraperitoneal mouse protection test. *Hugh H. Smith*

BIGHER, J. C. & GAST-GALVIS, A. The Efficacy of Vaccination in the Prevention of Yellow Fever in Colombia. *Amer J Hyg* 1944 Jan 1 39 No 1 58-66 [13 refs.]

Reported studies on the immunity produced in man by vaccination against yellow fever have in general been limited to the demonstration of neutralizing antibodies in the blood sera of vaccinated persons. This paper sets forth direct evidence of the absence of yellow fever in vaccinated persons whose exposure is manifested by the appearance of cases in others of the same community.

In the interval between the introduction of yellow fever virus into the Rockefeller Foundation laboratories in 1927 and the first successful attempts to immunize investigators in 1931 a total of 16 cases of yellow fever five of them fatal occurred among laboratory workers exposed to the virus. Since vaccination became available in 1931 not a single case of yellow fever infection has been encountered in over 200 such persons even though some of the workers are known to have been bitten by infected mosquitoes in the field and in several instances accidental inoculations of virulent yellow fever virus have been reported.

Beginning in 1937 a large scale vaccination campaign was undertaken in Colombia to protect the population against yellow fever in regions where conditions appeared favourable for the existence of the disease. At the end of 1941 a total of 605,781 individuals had received the vaccine. Careful records were kept of those inoculated so that subsequently individual could be definitely identified. Of the 198 proved and 45 probable cases of yellow fever which were discovered in Colombia after the initiation of the vaccination campaign only one occurred in a person who had received vaccine. This was in a boy inoculated five days before he became ill when he was apparently in the incubation stage of the disease and before the production of antibodies could be expected. Many of these cases occurred in known endemic areas where over 90 per cent of the population were vaccinated. Yellow fever continued in the small unvaccinated fraction while it disappeared among those inoculated. It is generally recognized by the people themselves in the endemic areas that a person who is vaccinated against yellow fever will not develop the disease.

In Muzo a notorious area of yellow fever endemicity 61 per cent of the people had been vaccinated by the end of 1938. During both 1941 and 1942 cases of yellow fever were discovered in Muzo. In spite of the fact that the non-vaccinated part of the population was diminishing

the cases occurred exclusively in this minority. The experience here indicates that the immunity following vaccination was effective for at least four years.

Of the 7 003 post vaccination sera collected in Colombia and tested by the intraperitoneal mouse protection test only 6.6 per cent failed to show evidence of protective antibodies. It could be expected that some cases of yellow fever might have been found among those giving negative protection tests. Such a result has not been encountered. This would indicate that under natural conditions of infection the actual degree of immunity conferred by the vaccination is appreciably higher than would appear from the protection test results. However in practice it is felt that such non reactors should be revaccinated.

Hugh H. Smith

BEVIER G. Some International Aspects of Yellow Fever Control
British Guiana Med. Ann. 1943 13-31 1 map [26 refs.]

The epidemiology of yellow fever both in the jungle and in towns and cities is briefly discussed and the appropriate measures of control are outlined. The necessity for international co-operation in the investigation of yellow fever and in the application of measures to prevent its spread to uninfected areas is emphasized. The author makes a plea for some recognition for those countries which have studied their yellow fever problem and have rendered their cities and ports free from *Aedes aegypti*. He suggests the following classification of areas in regard to yellow fever: (1) Infected areas where clinically recognizable *Aedes aegypti* transmitted cases exist; (2) Endemic areas where the existence of jungle yellow fever is suggested by positive protection tests in children under six years of age or demonstrated by viscerotomy or where jungle yellow fever is suspected but where adequate studies have not been made; or urban areas which have traffic with such forest areas and do not attempt to control *Aedes aegypti*; (3) Potential epidemic areas wherever *Aedes aegypti* mosquitoes occur; (4) Sanitary areas in which ports and airfields and areas about them are free of *Aedes aegypti*.

Hugh H. Smith

POTENZA L. La viscerotomia en Venezuela [Viscerotomy in Venezuela] *Rev. Sanidad y Asistencia Social* Caracas 1941 Aug v 6 No 4 461-8 English summary

In 679 viscerotomy specimens examined in Venezuela from 1937 to 1940 no evidence of yellow fever was found. Certain suspected cases were found to be due to poisoning by carbon tetrachloride.

Charles Wilcocks

SÁ ANTUNES W. S. O Serviço Nacional de Febre Amarela e suas realizações [The National Yellow Fever Service of Brazil] *Hospital* Rio de Janeiro 1943 Jan v 23 No 1 5-18 9 figs (3 maps)

PLAGUE

TOWNSEND S L Plague (Bubonic and Pneumonic) in Port Said
J Roy Nat Med Soc 1944 Jan 1 30 No 1 25-9

Port Said at the entrance of the Suez Canal and a universal port of call for shipping from all parts of the world reports cases of human plague every year. Plague is therefore endemic here and might possibly become epidemic. Only one case was recorded in 1940. In 1941 there were 1st and in 1942 six cases. As often happens diagnosis of first cases may be delayed and it is only with the declaration of plague infection that an expectant look-out is developed. Bacteriological diagnosis which is easily obtained by examination of the material from aspiration of the bubo confirmed the clinical verdict. A useful feature clinically is the extreme tenderness of the bubo even when the patient is semi-conscious. He will stir when it is touched.

Treatment of cases in 1941 was by M & B 693 in the high dosage of 12 gm orally on the first and second days and 6 gm on the third and fourth days. Apparently there was little effect in the small number of cases treated on either the prognosis or the clinical course of the disease. Prophylactic measures were of the usual type including vaccination of the entire Arab population. Restriction of movement generally was impossible as otherwise the work of the port would have been brought to a standstill. In 1942 however a much more frightening event occurred namely the outbreak after the usual bubonic cases of pneumonic plague. It was the first time that pneumonic plague had occurred in Port Said. Once more the intimation of the fact was delayed and the first diagnosis was pyrexia of unknown origin and terminal bronchopneumonia. By the sixth day the first patient was coughing up blood stained fluid and three days later his three brothers became ill all on the same day. Altogether there were nine cases of the septicæmic or pneumonic plague. Clinically the cases resembled severe bronchopneumonia and the blood stained sputum contained numerous plague bacilli. Treatment by sulphapyridine (2 gm every four hours) and 40 cc antiplague serum daily for three days do not seem to have influenced the lethal outcome. The pneumonic epidemic of nine cases seems to have lasted for about a month and then ceased. Preventively the civilian authorities were loath to take drastic measures but the Services cut down communication between the civilian and Service personnel in the town to a minimum.

W F Harley

MEYER S Entwicklung und gegenwärtiger Stand der Pestverbreitung in Afrika. (Development and Spread of Plague in Africa)
Deut Tropenmed Ztschr 1943 Aug 1 & Sept 1 47 Nos 15/16 & 17/18 399-423 46. 75 [Numerous ref.]

This publication is an abbreviated version of a doctorate thesis presented at Hamburg in 1942. It gives a fairly complete review of the present position of plague in the African continent. The subject is treated regionally under the five headings North Africa West Africa South Africa East Africa and Madagascar. In his account of North Africa and Egypt the author refers to the pandemic of plague which broke out in Egypt in 1899. It was not in that year however but in 1869 that the Suez Canal was opened. His summary which omits all the statistical data given in the text is as follows — Although the

epidemiology of plague was cleared up at the beginning of the last pandemic and counter measures had been instituted everywhere the disease has established itself in large areas of Africa. The classical measures (isolation destruction of rats inoculation) have failed against these secondary enzootic foci among the wild rodent population. Plague authorities are confronted with new and difficult tasks. The territories which are pest ridden in this sense are mainly South Africa and certain parts of North and West Africa while in East Africa and Madagascar the chief danger is from the house rat and its fleas. Deratization protective inoculation and creation of rodent free zones are the most effective anti plague measures against the so-called sylvatic plague. In this connexion reference may be made to the new vaccine developed in the Pasteur Institute of Tananarivo. *W F Huxley*

TRUFANT S A Sylvatic Plague Probable Origin in United States, Distribution Potentialities as Reservoir for Infections in Man. *New Orleans Med & Surg J* 1943 Nov 1 96 184 [Summary taken from *J Amer Med Ass* 1944 Jan 29 1 124 No 5 325-6.]

Trufant presents a historical review of plague in the United States. According to the importation theory infected rats carried the plague in ships from the Orient to San Francisco. The enzootic theory suggests that plague infection is enzootic in the Western United States as it is in Asia and probably the steppes of Russia and in South Africa. Plague in wild rodents exists in at least twelve of the Western states. Localized epizootics occur usually in the early spring. A vector is substantially indispensable to complete the propagation of plague among wild rodents. For the ground squirrel the vector is the flea *Diamesus montanus*. This flea not only harbored *Pasteurella pestis* but also conveyed it from squirrel to squirrel. These fleas are known to be capable of transmission of the infection after several months of storage and starvation. Very low temperature seems to increase the period of infectivity. So far spontaneous infections or reservoirs of plague have been established in over 31 rodents and in rabbits the former including ground squirrels marmots chipmunks wood rats kangaroo rats and prairie dogs. Plague once established in a wild rodent population persists but what the mechanism is has not been demonstrated. The author presents tables which list infected rodents and arthropods and the states in which they were found. Sylvatic plague as transferred to man in the United States is not pneumonic or extremely virulent. However it is at least theoretically possible that plague might appear in epidemic proportions provided certain conditions as yet inadequately understood are conducive to an increased distribution of the infective agent.

SAENZ VERA C Campaña antipestosa intensiva en la provincia del Chimborazo (Ecuador) [Intensive Anti plague Measures in Chimborazo (Ecuador)] *Bol Oficina Sanitaria Panamericana* 1943 Oct 1 22 No 10 873-82 1 fig (map) English summary

In this anti plague campaign the province of Chimborazo was divided into three parts served by three brigades each consisting of a chief inspector inspectors and workers. The work was synchronized throughout the province so that no overlapping took place.

[June 1944]

According to MACCHIAVELLO (this Bulletin 1941 v 38 624) working in Brazil fleas inhabiting the nests of rats can preserve a plague infection for a long time so that the conditions required for its emergence in epizootic or epidemic may be maintained. His conclusions have been confirmed and they represent an important consideration for antiplague measures on a large scale. They also account for the absence of plague during certain months of the year (July to December) in Chumborazo. Another point made is that guinea pigs or cures are often more possible for epizootics and that here these rodents are destroyed by the use of cyanogas and flame thrower bombs. Results seem to have been eminently satisfactory. A paste of arsenic and phosphorus was used in the burrows. Cures (guinea pigs) are beset with fleas mostly of the species *Rhopalosylla calicola* along with a small percentage of *Pulex irritans*. The ratio of rodents to a distance is not considered to be a factor in the spread of epizootics. There is too much food obtainable in any district. One result of this rodent localization is the strict limitation of outbreaks of human plague in many cases to a single family.

In Chumborazo there were 87 cases of plague in 1939 40 in 1940 39 in 1941 1 in 1942 and none in the first half of 1943. During the period August 1st 1942 to July 31st 1943 43 867 rats were trapped (13 730 *Rattus alexandrinus* 19 815 *musculus*) and the spleens of 23 629 rats were examined at the Riobamba laboratory with no fewer than 103 positive (species *rattus*). The campaign during this period is shown to have been successful in terms of rat extermination and reduction of human plague. W F Harley

PORGES R The Use of Curtain Walls in Ratproofing. Pub Health Rep Wash 1943 Dec 24 v 58 No 52 1831-5 [10 refs]

Curtain walls are non weight supporting and are placed in the ground outside buildings which require to be protected against the ingress or egress of rats. Such walls are needed here foundation walls are of insufficient depth. Such experiments have been instituted to determine the depth to which rats will burrow. If the test rats are well fed the limit was approximately 22 inches but if at this was not a safe limit was demonstrated by the typhus control programme at Charleston S.C. Protection by curtain walls is specially needed for food establishments. Rat experiments have found that burrows under 48-inch curtain walls but the addition of a 12 inch horizontal flange at the base of the wall defeated the rat completely. A concrete L shaped wall was developed consisting of a vertical portion approximately four inches thick having a horizontal flange at the bottom 12 inches over all horizontal measurement. As regards depth a 24 inch L wall protected all units including 10 food establishments. While rat proofing old buildings many foundations are encountered extending 18 to 24 inches below ground surface that may be protected by merely installing a flange at the base. If the establishments already have concrete floors it is doubtful whether curtain wall are necessary. W F Harley

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

BRINK V Amoebiasis *South African Med J* 1943 Dec 11 v 17
No 23 363-6 [19 refs]

The importance of amoebiasis is not sufficiently appreciated in the Army in civil life amoebiasis causes much illness of which the true cause is frequently not suspected and in military life exposure to infection is greater. Amoebiasis is not confined to the tropics it is widespread throughout the world. In the United States 5-10 per cent of the population are infected in New Guinea over half the inhabitants have positive stools in South Africa infection must be at least as common as in the United States especially in the warmer zones such as Natal.

The symptoms of amoebiasis are exceedingly varied and may not necessarily be referred to the abdomen. In 100 consecutive cases seen by the author the diagnoses on admission to hospital included anaemia (2) malaria (1) pneumonia (2) pleurisy and influenza (2) haemorrhoids (2) and peptic ulcer (3). He classifies the cases clinically as follows —

Group 1 —Chronic amoebic neurasthenia fairly common and easily overlooked

Group 2 —Chronic intermittent amoebiasis with periodic diarrhoea. Some of these patients may become chronically constipated others may become anaemic without much abdominal trouble. Pain in the abdomen may be a feature and may be colicky generalized or localized leading to operation for appendicitis. Irregular pyrexia and headache may be features of chronic intermittent amoebiasis.

Group 3 —Chronic progressive amoebiasis. In this group are included patients with chronic dysenteric amoebiasis ulcerative colitis or liver abscess.

Group 4 —Dysenteric amoebiasis. In this group are included those with true acute amoebic dysentery which except in the tropics is relatively uncommon.

Group 5 —Latent amoebiasis the subjects of which present no symptoms they are the carriers or cyst passers. The author argues that patients suffering from acute amoebic dysentery and passing active amoebae in bloody stools are not really infective to others since ingestion of these active forms cannot give rise to new infection. Infection has been shown to occur only when cysts are swallowed and the real danger to the community therefore is the apparently healthy person in whose faeces cysts are present. He develops the view that all persons harbouring *Entamoeba histolytica* should receive treatment whether the infection causes symptoms or not.

Emetine alone cannot be relied upon to cure amoebiasis though it is often effective in causing disappearance of symptoms and therefore has a useful place in therapy. Emetine has a cumulative action which must always be remembered. The treatment advocated by the author is as follows —

Patient confined to bed (14-21 days) —Daily emetine injections ($\frac{1}{2}$ -1 grain) to a total of 10-12 grains together with a suitable arsenical (carbarsone four grains twice daily for a week and repeated after an interval of four days) and daily bowel washes with 2 per cent sod bicarb solution followed by retention enemata of 8 oz. Chinofoin

(Yatren) 2 per cent for four days then on alternate days increasing the concentration to 5 per cent. These measures are used concurrently.

Patient comalescent—An oxyquinoline derivative (Chmiofon Yatren Enterovioform Diodoquin) by mouth for three days followed by Kurchi—bismuth iodide tablets five grains twice daily for three days. These two measures are used alternatively (neither being given on the 5th day) for three weeks.

Charles Wilcocks

OSBORN H S Amoebiasis on the Witwatersrand South African Med J 1943 Dec 11 17 No 23 361-2

Inhabitants of the Witwatersrand are exposed to two potential sources of amoebic infection the first from African food handlers recruited from the endemic areas of Natal Nyasaland etc the second during holidays spent in these areas. The author reports the result of stool examination of 60 European and 13 African many of these complained of abdominal trouble—

E histolytica cysts

E histolytica cysts

F col cysts

Iodan oeba tschl y t

Endol a nan y ts

Giard a nest n l

Ch lo ast x ne sl

(3 Eur perin 13 Africa

1

None of the three Europeans with *E histolytica* cysts gave a history of dysentery one was a chef on the railway

Charles Wilcocks

MUNF J X Ray Appearances in Amoebic Hepatitis Brit J Radio 10 1944 Feb 17 194 48-53 8 figs [10 refs]

The direct radiological sign of amoebic hepatitis are limited. A Bucky film of the liver area may indicate its size and the portion enlarged. Sometimes gas may be visualized in an abscess cavity thus affording an indication of its size and site. X ray evidence of amoebic hepatitis is limited mainly to indistinct shadows on the right half of the diaphragm and to the right lower lung field but only in upward enlargement of the liver can diaphragmatic changes be seen. This may be part of a generalized enlargement or only the subphrenic part of the liver may be involved.

In the first group no radiological signs in the diaphragm can be expected if the lower anterior part of the liver only is involved or in intrahepatic or subhepatic abscess without generalized liver enlargement. Thus in most cases of evident enlargement of the anterior or lower part of the liver a diaphragm normal in position shape and movement can be seen on screening.

The second group is characterized by different degrees of elevation of the right half of the diaphragm as part of a generalized enlargement or due to localized subphrenic enlargement with degrees of restricted or abnormal movement and pathological changes in the right lower lung field. These points are discussed in a survey of 10 cases and are classified as follows—

Elevation of the Diaphragm

Total elevation—The first seven cases showed different degrees of general elevation of the right hemi diaphragm in connexion with abnormal movement blurring and a small pleural effusion affording a clear radiological picture suggesting suprahepatic abscess

Bulging of diaphragm—Three belonging to the second group showed different degrees of bulging of the diaphragm with generally restricted movement or absence of movement of the bulge on respiration but normal or even increased excursion in the other part of the diaphragm

Shape of the diaphragm—The diaphragm either preserves its normal shape or the bulge into the chest increases Two factors are responsible—(1) increased intra abdominal pressure and (2) negative pressure within the thorax acting on a weakened diaphragm when the costo phrenic angle is narrowed In one instance however this angle was increased from flattening of the diaphragm

Movement of the diaphragm—All degrees of restricted movement are found It may be the only sign of a pathological liver condition In the present series with one exception excursion was seen on respiration

Finally the value of *paradoxical movement* of the diaphragm is discussed This is elicited by Muller's and Hitzenger's tests The former—upward movement of the diaphragm on attempted respiration with closed glottis or nose and mouth—indicates damage to the power of contractibility of the diaphragmatic muscle The latter test produced by short inspiration through the nose with mouth closed is a modification of the former This causes a short lasting negative intra alveolar pressure due to inspiratory expansion of the thorax with insufficient exchange of air Only a diaphragm with normal contractive power is able to resist this lung suction caused by negative pressure and therefore moves normally but a diaphragm the contractibility of whose muscles is either impaired or lost will follow suction of the lung and move *paradoxically* upwards on inspiration

In the slowly working Muller's test even a weakened diaphragm may be able to resist suction of negative intra alveolar pressure and move normally but on *sniffing* with sudden onset of suction only a diaphragm with normal muscles will move normally Muller's and Hitzenger's tests are positive in cases of paresis or paralysis of the diaphragm from injury to the phrenic nerve anterior horn cells or local damage

In amoebic hepatitis (in three out of the series) paradoxical movement was attributable to the last named condition Blurring of the diaphragm (in two cases) was probably due to local changes and oedema

Atelectasis of the right lower lung field—Insufficient respiration of the lung field may be due either to direct pressure of the elevated diaphragm or to partial or total restriction of movement of the right hemi diaphragm it is held responsible for insufficient ventilation and expectoration which permits mucus to collect and block bigger or smaller bronchi thus causing different degrees of atelectasis These appear as small atelectatic zones of plate like or band like shadows in the lower lung lobes At first the atelectasis is conical in shape and surrounds the involved bronchus but soon it assumes a horizontal plate like aspect because collapse can only occur in the cranio-caudal direction

It can be assumed that many cases diagnosed as pneumonic consolidation are in fact atelectasis

P Manson Bahr

DELANNEY L A & BEAUM E H *Balantidium* Coll. Report of Case with Proctoscopic Study *J Amer Med Ass* 1943 Oct 30 v 123 No 9 549-50 3 figs.

The patient a man 33 years of age gave a history of 17 years of repeated attacks of diarrhoea with passage of blood and mucus. At one time a diagnosis of *E. histolytica* infection was made and emetine treatment instituted. As this drug was not tolerated acetarsone was substituted. This controlled the condition for some weeks but relapse occurred. The same result followed a second course of acetarsone. Finally proctoscopic examination was made. This revealed a diffuse inflammation of the rectal mucosa with irregular patches resembling diphtheritic infection in the upper part. When these patches were scraped off microscopic examination of the material revealed numerous *Balantidium coli*. Treatment with carbarsone and then oil of chemopodium gave only temporary relief. Finally diodoquin [diiodo-hydroxyquinoline] was prescribed ten 0.25 gm tablets a day for 20 days. The patient improved and showed no sign of relapse for 18 months. Repeated examination during this period failed to reveal any parasites.

C M Heryon

DEMIAKOV E A Ciliate of the Genus *Colpoda* found in a Child suffering from Haemorrhagic Colitis *Med Parasit & Parasitic Dis* Moscow 1943 12 No 2 60-64 2 fig. [In Russian.]

In the course of investigations on intestinal diseases carried out at Derbent (Caucasus) in 1937 the author on one occasion took a sample of faeces with a sterile glass tube directly from the rectum of a child aged 1 year 3 months who had been suffering for some time from persistent diarrhoea. The faeces were fluid with an admixture of mucus and pus. Part of the faecal specimen was examined in smears, the remainder was cultivated in Endo and Johnson's medium. After 4 hours at 37°C there appeared in the latter a culture of ciliates belonging to the genus *Colpoda*. The ciliate was maintained for a year in this and other media at 37°C. The detailed description with illustrations supports the author's diagnosis of the ciliate. Though the author himself makes no inferences from his finding there can be no doubt that this ciliate is not a human parasite but represents a free living coprozoic form in the present case a gut passer (*Darmpassier*). It had evidently passed through the alimentary tract of the child in the form of cysts which hatched only when transferred to a suitable external medium.

C A Hoare

RELAPSING FEVER AND OTHER SPIROCHAETOSIS

EL DON DEW R Relapsing Fever and *B. proteus* V Kirsibu
Correspondence *Nature* 1943 Nov 13 565

It was noticed in Ethiopia that there was an association between the finding of spirochaetes of relapsing fever in the blood and agglutination of *Proteus* AA. Of 600 cases in which spirochaetes were found 211 gave agglutination of M in dilutions of 1-100 or more but no such level was found in specimens of serum sent for the Kahn test.

Agglutination tests with *Proteus* XA were made every fourth day in 110 patients positive for spirochaetes most of whom were under arsenical treatment the results were as follows —

Clinical course	Agglutination of <i>Proteus</i> XA 1-100	
	Positive	Negative
No relapse	6	35
One or more relapses	22	27
Deaths	—	20

In relapsing cases which responded there was a progressive rise in titre after the last relapse the titre fell rapidly to less than 1-50 in a month

These cases occurred in the highlands where *Ornithodoros* is unknown the disease was probably louse borne Further investigation was not possible
Charles H Hildicks

MARGUES A Febre recorrente de carriage atipica em Xinavane (Mocumbique) [Atypical Relapsing Fever in Xinavane (Mozambique)] *An Inst Med Trop Lisbon* 1943 Dec 1 No 1 187-97 2 folding graphs

The relapsing fever in this district is transmitted by *Ornithodoros* [the species is not mentioned] The incubation period ranges from less than one week to more than two The course of the fever is peculiar in some cases it is continued for a month and resembles that of typhoid fever but this it is acknowledged may be due to associated bronchopneumonia or nephritis in others there may be pyrexia for some hours followed by an apyrexial period lasting for weeks during which the patient may leave hospital and relapse after arrival home Splenomegaly may be transient and even in severe cases may be absent it was not found in 18 per cent of the author's patients Nervous manifestations—neuralgia neuritis sciatica epileptiform seizures—were common as were ocular conditions iritis cyclitis choroiditis pneumonia and bronchopneumonia serious haemorrhages and oedema with albuminuria due to renal or cardiovascular lesions

The disease is more resistant to arsenical treatment than is the ordinary type of relapsing fever One patient after a course of injections of 914 spread over five months in a few days showed numerous spirochaetes in his blood Bayer 205 Bismarsen and mercurials gave no better results
H Harold Scott

STAVISKY J D [The Treatment of the Middle Asia Tick borne Spirochaetosis with Myoarsenol] *Med Parasit & Parasitic Dis* Moscow 1943 12 No 2 56-9 [In Russian]

The author reports the results of treatment of tick borne relapsing fever in Middle Asia with a Russian drug produced in 1935 under the name Myoarsenol which contains from 18.5 to 19.5 per cent arsenic Myoarsenol is dissolved in 2-3 cc distilled water at room temperature and is injected intramuscularly (into the buttocks) using a long

needle (5-7 cm). The course of treatment is as follows: 1st day 0.15 cc. 2nd day 0.3 cc. 3rd day mixed 4th day 0.45 cc. 5th and 6th days mixed 7th day 0.45-0.6 cc.
The total number of patients treated up to the present is 40. As a rule the paroxysms of fever ceased by the 3rd day of treatment after which no spirochaetes could be detected in the blood. There were no signs of arsenic poisoning and only two cases relapsed. The author regards the results as promising. C. A. Hoare

A. HUBER, L. L. & PACKCHANIYAN, A. Histogenesis of Experimental Ictero-hemorrhagic Spirochetosis in Albino American Deer Mice (*Ictromys scirpae*) inoculated s.c. with the D.C. (District of Columbia) rat strain of *Leptospira icterohaemorrhagiae* and killed in groups at daily intervals from the 2nd to the 7th day. Amer J Trop Med 1943 Vol 23 No 6 607-13

A study of the histogenesis of icterohaemorrhagic spirochaetosis in albino American Deer Mice based on the study of 30 of these mice inoculated intraperitoneally with the D.C. (District of Columbia) rat strain of *Leptospira icterohaemorrhagiae* and killed in groups at daily intervals from the 2nd to the 7th day. Jaundice and lepto-spirae in the blood were first noted on the 5th day. Jaundice and haemorrhage rapidly increased and were marked by the 6th day. Leptospirae were present in the blood in great numbers by the 6th day but had decreased by the 7th day.

The kidney cortex mainly the inner portion showed progressive changes in the tubular epithelium including cytoplasmic swelling, dispersion of granules, nuclear enlargement and in late stages lack of adhesion between cells and focal necrosis.

The pathological changes in the liver comprised cell enlargement, increase in number of nuclei in cell swelling and oxyphilia of the hepatic cells, necrosis of an occasional parenchymatous cell and disruption of the liver cords. Erythrophagocytosis was present on and after the 5th day and in the spleen was often prominent. Leptospirae were abundant in the liver much less numerous in the kidney and were present only in very small numbers in the heart and lungs.

The hepatic damage is considered sufficient to explain the occurrence of jaundice in these infected deer mice. Intra-hepatic biliary obstruction was not observed. E. Hindl

YAWS AND SYPHILIS

KALZ, F. & NEWTON, B. L. Syphilitic Juxta Articular Nodules. Arch Dermat - Sept 1943 Dec 48 No 6 626-34 3 figs 34 ref.]

Juxta articular nodes first described fully by JEANSELME in 1899 are defined by the authors of the present article as painless slowly growing subcutaneous fibrous nodules often symmetrical in their distribution and if untreated of long duration. They are situated in the vicinity of joints especially of the extremities and are not attached to the skin or related to bursae or tendons. According to Jeanselme their sites of predilection are in order of frequency elbows knees tibial tubercles sacro-coccygeal area and costal cage. Histologically according to

Jeanselme they show three zones in outer one of monocellular cell exudate with dilated blood channels in a loose connective tissue an intermediate fibroma like scar or tissue zone and an inner one of hyalinized tissue with amorphous changes. These changes were essentially those found in one of the nodes described by the present authors with the exception that in their case there were cyst like spaces bounded by fibre-like whitish to yellowish green tissue. Smaller nodules are fibroma like.

The authors say that such nodes were described in 1778 by BERTIN as occurring in natives of Guadeloupe afflicted with syphilis and yaws. Other causes have been mentioned e.g. rheumatism by BARLOW but whether or not such other causes are ever responsible there can be no doubt about the frequency with which yaws and syphilis are present in such cases. They occur more particularly in tropical and subtropical countries than in colder ones. Amongst other authorities quoted by the authors of the present article are HU and FRAZIER [this *Bulletin* 1934 v 31 275] who found many such cases in China. FENNER similarly in the aborigines of Australia and HUDSON who found them as commonly in Euphrates Arabs suffering from bejel or non venereal syphilis [*Bulletin of Hygiene* 1936 v 11 908] as in areas where yaws was prevalent. JESSNER [this *Bulletin* 1925 v 22 241] after studying syphilis in Siberia as a member of the Russo-German expedition

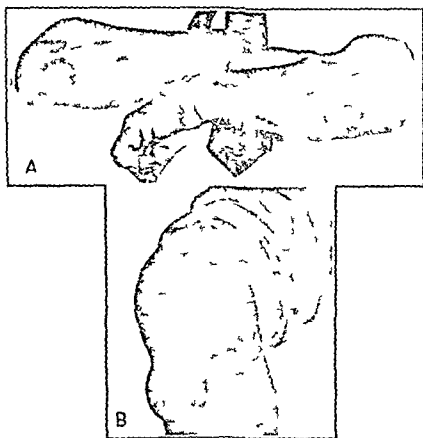


Fig 1—A juxta articular nodule of thirty years duration on the left elbow and one of fourteen years duration on the right elbow of a syphilitic Negro. B juxta articular nodule of thirty five years duration on the left knee of the same Negro.

[Reproduced from the *Archives of Dermatology and Syphilology*]

declared that there was no way of differentiating such nodes occurring in syphilis from those in yaws.

The authors of the present article describe in detail a case of the kind in a 71 year old negro who had suffered from untreated syphilis for probably over 30 years and had developed the first nodes on the right and then the left knee about a year after the first sore on his penis. He had subsequently developed nodes on the elbows as shown in the illustration reproduced above.

They had grown slowly without causing any discomfort over a number of years. When the patient was admitted to hospital hard rubbery nodules were found along the ulnar borders of both elbows and a larger one on the left knee. Similar tumours not visible but palpable and discovered by radiographic examination were present on the right external malleolus. The skin over the nodules was freely movable and they were themselves partly movable. The histological appearances are described and illustrated. The authors discuss as possible aetiological factor small repeated trauma, untreated syphilis and the tendency of negroes to form fibrous tissue—the latter discounted however by the occurrence of such growths in white persons. Response to treatment seems to depend largely on the age of the lesions and the amount of fibrous tissue which has formed. In the authors' case the nodules on the ankle decreased in size during three months anti-syphilitic treatment and they mention that in a Polish woman seen by one of them with a nodule the size of a cherry close to an elbow the tumour decreased by about one half in the course of two years' treatment.

L. W. Harrison

LEPROSY

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION (MADRAS PROVINCIAL COUNCIL) Annual Report 1942-43 [AUSTIN T. Chairman, Executive Committee] 10 pp. 1943. Madras Govt. Press.

Further progress is reported in spite of the threatened invasion of India. Epidemiological studies were continued at the Silver Jubilee Clinic for the Study of Child Leprosy, Saidapet; these have already been dealt with in this *Bulletin*. The most important point is that open case contact in 69.7 per cent of the cases was traced to an intrafamilial or house contact. Seventy such open case infected 141 children out of a total of 275 exposed to such close contact. Thus only 37.3 per cent of the contacts showed no signs of the disease but some may still do so [see COCHRANE and RAJAGOPALAN below]. Work at a rural investigation centre includes a trial of voluntary night segregation of infective cases in villages. The results of this plan are promising but not yet conclusive. Work at an urban investigation centre was discontinued by an emergency evacuation of the coastal area in 1942.

The Lady Willingdon Leprosy Sanatorium, Chingleput discharged 141 lepromatous cases: a recovered or quiescent but from 15 to 25 per cent have relapsed and been readmitted. The best results were obtained when the treatment was continued for six months after the symptoms had cleared up. Intradermal injections of hydnocarpus preparations have given better results than subcutaneous injections; they are also more popular. The efficacy of avenyl in rendering

positive Wassermann reactions negative has proved disappointing. The Children's Leprosy Sanatorium at Ettapur admitted 37 boys and discharged 11 during the year. The teaching of leprosy workers is being continued. Altogether the year's record is a good one.

L. Rogers

COCHRANE R. G. & RAJAGOPALAN C. The Study of Family Susceptibility in relation to the Epidemiology of Leprosy. *Leprosy in India* 1943 July v 15 No 3 76-81

This is a careful study under the favourable conditions afforded by the Silver Jubilee Clinic for the Study of Child Leprosy at Saidapet Madras. The important rôle of familial susceptibility has been stressed in North America by AYCOCK and MCKINLEY [this *Bulletin* 1938 v 35 884] but WADE [*ibid* 1942 v 39 223] in an editorial article concluded that there is not sufficient evidence to decide whether or not hereditary susceptibility to infection does exist. The importance of contact is very generally accepted as the greatest factor in the spread of leprosy. An analysis has therefore been made by the authors of the intrafamilial open contacts of 245 cases of leprosy among children registered at the clinic during the five years since it was opened.

TABLE I

No. of cases with a history of intrafamilial open cases in family	245
No. of families	125
Total persons in these families (adults 442 children 330)	772
Average size of the family	6.1
Percentage of child cases to total children found in the family	56.4 per cent

Thus more than half the children exposed to infection in the family have already shown signs of leprosy.

TABLE II

18 Fathers have infected 27 out of 47 children	57.44 per cent
8 Mothers have infected 12 out of 20 children	60.0
9 Maternal uncles aunts have infected 13 out of 28 children	46.4
16 Paternal uncles aunts have infected 21 out of 34 children	61.8
18 Brothers and sisters have infected 29 out of 50 children	58.0
30 Co-tenants have infected 41 out of 80 children	51.2

Thus the highest number of infecting sources is to be found in co-tenants and the number of children infected from this group is the largest of all. Further the percentage of children infected by co-tenants and relatives respectively does not show such a marked difference as to suggest that the presence of familial susceptibility in the latter group has influenced to a greater degree the incidence of the disease in these

families the type of contact remaining the same (household). In fact the percentage of children infected by co-tenants is higher than those infected by at least one group of relations the maternal uncles aunts and cousins. Therefore it appears reasonable to conclude that the importance of familial susceptibility in leprosy is not so great a factor as some authorities suggest.

Further analysis showed that the percentage of children without signs of leprosy was 63.3 in those aged 0-4 years 36 per cent at 5-9 years and 32.8 per cent at 10-14 years of age. More of the youngest children may yet have leprosy.

Moreover an analysis of 391 families shows that the number of children infected in the different groups varied between 43.47 per cent and 59.94 per cent among adults in the same families the infection rate varied between 18.51 per cent and 71.73 per cent irrespective of the nature of the contact in the group. In the case of the children the highest rates were seen in two groups with open case contact in the family in spite of the fact that family history is the same in both groups. These data also indicate that family susceptibility is not an important factor.

L. Rogers

LEPROSY IN INDIA. 1943 July 15 No 3 67-70 [52 refs] Diet and Susceptibility to Leprosy Editorial

The first part of this article deals with evidence in support of the view that undernutrition and bad diet predispose to infectious diseases. It deals mainly with deficiencies of vitamins and concludes that a deficiency of vitamins A and C renders both experimental animals and human subjects more susceptible to infection in general and that supplementary supply of them corrects the deficiency and removes the increased susceptibility. On the other hand there is no evidence that vitamins B and D play any important part in this respect. The addition of milk to a diet may also increase resistance to infection. The effect of diet on the more chronic disease tuberculosis is next considered and evidence is quoted in support of the view that deficiencies of vitamins C and D predispose to tuberculous disease in white rats and guinea pigs. The increase in human tuberculosis after the war of 1914-15 is also considered to have been influenced by deficient diet and some experimental evidence is quoted in support of this view.

Leprosy is then considered. The evidence of TOKITA that animal protein is absent from the diet of highly leprosy tribes of N. China and of ATKINSON, BILLY, and 1934 31 54 1935 v 32 348 that the disease is rare in milk-consuming Arabs in the Anglo-Egyptian Sudan is quoted. The high incidence of leprosy in the rice-eating peoples of Bengal and other parts of India and in China is also referred to. MAXWELL reported an increase of leprosy in the province of Hupeh in Central China after flood and famine. The foregoing evidence is not conclusive in the absence of confirmatory experimental work because it has not been proved that the diet was more deficient than that of families without leprosy cases. With regard to vitamins B₁ and C in the urine in leprosy and in lepromatous cases the C content of the aqueous humour of the eye was much decreased. UCHIDA found that in rats infected with experimental leprosy vitamin A but not B₁ prevented the occurrence of morbid changes. However BADGER *et al* [this Bulletin 1941 30 29] have reported a shorter incubation period of

inoculated rat leprosy when B₁ was deficient GAVRILOV *et al* have reported similar results in guineapigs but other observers report variable results with the different vitamins

The general conclusion is that states of malnutrition and under nourishment do predispose to infection with leprosy but further experimental work together with field studies is required to clear up the matter

L Rogers

SOLSONA (O ILLERA J Estudio sobre la endemia leprosa en nuestro Protectorado Marroquí [Leprosy in the Morocco Protectorate] *Med Colonial* Madrid 1943 Jan 1 v 1 No 1 29-52 12 figs & 2 maps [39 refs]

It was in 1929 that Luengo GARCIA recorded the first cases of leprosy to be seen in Morocco and in 1943 Dr MONTAÑÉS of the Pontilles Leprosarium noted only four cases in Ceuta The author states that there were 56 names on the register seven imported and 49 indigenous Twenty five were in Gomara 14 in Lucus nine in Tetuan five in Tangier and three isolated cases As for nationality four were Spanish 41 Moroccans in the Spanish zone nine in the French zone one Portuguese and one unknown Forty six were males only 10 were females None was under the age of 10 years and in succeeding decades the numbers were 5 8 14 15 5 four were between 60 and 80 the ages of five were not known Twelve were suffering from the cutaneous form 40 from the mixed none was recorded of the purely nervous type but of four the clinical form was not stated Photographs of patients have been well reproduced Nothing is said as regards medicinal treatment Prophylaxis is on the usual lines

H Harold Scott

PARRI R KITCHILL J R & SHEPHERD S G A Case Report of Cutaneous Leprosy with a Brief Discussion of the Classification Treatment and Epidemiological Portent *Ann Intern Med* 1943 Nov v 19 No 5 805-8

This is a case of sporadic leprosy in which the failure of early diagnosis exposed the community to some danger of infection The patient was a Russian Jew admitted to a Philadelphia hospital for fractured femur and later treated in a nose and throat clinic for chronic hypertrophic rhinitis Two and a half years later after unsuccessful treatment for atypical Buerger's disease a leonine facial appearance and facial nodules led to microscopical examination which revealed abundant bacilli like *Mycobacterium leprae* It was then learned that the patient's wife had died of leprosy eight years previously and he had moved to another city to avoid surveillance by the local Department of Public Health He had been seen by many physicians who overlooked the disease although the leonine appearance had been noted on his first admission to the Philadelphia hospital He is now considered to be a mixed case with both lepromatous and neural symptoms This case should be borne in mind in view of the return after the war of soldiers infected with leprosy while on service in endemic areas of leprosy such as occurred in Great Britain and the U.S.A. after the Great War of 1914-18

L Rogers

Fior. H & BLANCO J F. Lupus eritematoso generalizado y atípico en un enfermo de lepra (Atypical and Widespread Lupus Erythema tosus in a Leper). *Rev. Argentina Dermatofisiología* 1943 Dec v 27 No 4 559-67 5 figs.

An Argentine 28 year old male showed signs of anaesthetic leprosy in 1930 later maculae and nodules appeared. He had treatment but irregular and inadequate and in 1939 was classified as L₁. With chaulmoogra ethyl-esters his state improved but the following year he developed erythematous and achromic patches squamous in parts in oiling the nose and cheeks (butterfly patch) the scalp submaxillary and mandibular regions the forehead neck throat and arms. This was at first diagnosed as psoriasis but on further consideration and as the result of biopsy examinations the diagnosis was changed to lupus erythematosus. The Mantoux reaction was positive Mitsuda negative Kahn presumptive positive Wassermann and bismuth alternately. It was Treatment was by chaulmoogra and bismuth alternately. The author particularly noted that as the lupus erythematosus developed the leprosy which had been progressing began to recede. The author suggests the possibility of a relative immunity between a developing lupus erythematosus and an established leprosy. H Harold Scott

Dreyer A. Formes de passage de la lepre neurale à la lepre lepromateuse. *Transition of Neural into Lepromatous Leprosy*. *Ann So Br de Med Trop* 1943 Mar 31 v 23 No 1 13-17

Three cases met with in the Congo area are recorded which illustrate an unusual sequence of events, the occurrence of which has been much discussed recently by RODRIGUEZ WADE and PLANTILLA [this Bulletin 1940 37 630] and others. The first showed numerous simple neural macules and mutilations together with numerous lepra bacilli in the skin of the ears. The other two presented minor tuberculoïd neural macules together with positive thickened ear lesions in one and positive infiltrated lesions on an arm and on the back in the other. Two other cases are quoted from other writers. The author thinks his cases could legitimately be classed as mixed leprosy infections. L Roberts

FAGET G H, POGGE R C, JORAN EN F A, DENAN J F, PREJEAN B M & ECCLES C G. The Promin Treatment of Leprosy. *A Progress Report*. *Pub Health Rep Wash* 1943 No 26 v 58 No 48 1729-41 8 fig on 2 p.

Promin (Parke Davis & Co) is the sodium salt of p p diaminodiphenylsulphone n.n. dioxetose sulphate. It has been used with success in experimental tuberculosis of guinea-pigs. Two years use show it to be the best of the sulphonamides for the treatment of leprosy. No specific action of the drug on Hansen's bacillus is known. It is too toxic for use orally. Intravenously 1 to 5 gm. daily for six days of the week were given mostly 5 gm. doses continued with one or two weeks rest three times a year up to two years. Toxic reactions — Anaemia occurs in 46 per cent. after eight weeks intravenous treatment. Blood counts were done every two weeks. A fall to 3.5 million erythrocytes took place in 71 per cent. and to 3 million in 9 per cent. If there is a fall to under 4 million ferrous sulphate or ferrous carbonate should be given and if a further

fall occurs oral liver preparation should be given promin treatment should be discontinued while the count is below 3 million and liver extract should be given parenterally with iron by the mouth. Promin can be resumed when over 3.5 million. Leucopenia occurred in only 3 per cent. injections should be stopped if leucocytes fall below 3 000. Allergic dermatitis necessitates stopping injections which can be resumed with 0.1 gm gradually increased to 2 gm doses when the dermatitis has disappeared. It occurred in 16 per cent. Two thirds have been desensitized. Nausea occurred in 35 per cent vomiting in 7 per cent. they were transitory and preventable by taking one minute to inject 5 gm promin. Acute lepra reactions are less frequent than with other treatments. Exacerbation of old irido cyclitis occurred in 10 per cent but was of a temporary nature except in one case. Lymphadenitis was rare and subsided on reducing the dose to 1 gm.

Clinical material—All were positive bacteriologically and nearly all lepromatous cases not doing well were included so it was a severe test. Patients with eye nose and throat complications as a rule showed a marked improvement. Epistaxis occurred. Six cases with advanced lepromatous laryngitis improved as did lesions of the lips tongue gums and palate. Twenty two case reports are given and photographs before and after one or two years treatment show marked improvement in lepromatous cases. Table I shows the results in 21 mixed or advanced lepromatous and one neural case. Improved 15 stationary 6 worse 1. All the patients were treated for one year or over five of them became negative for bacteria. Table II shows 46 cases in which a shorter course of treatment was given all but six were lepromatous. Improved 26 stationary 17 worse 3 became bacteriologically negative 7.

In other cases a drug Internal Antiseptic 307 (Parke Davis) sodium 4.4 diaminodiphenylsulphone 2 acetylsulphonamide) closely allied to promin has been given orally in doses of 5-15 grains daily average dose 10 grains daily with controls taking a placebo. After eight months the disease was seen to be checked in a number of cases. In all cases the urine was examined every two weeks but no kidney damage was noted.

It is claimed that although as yet no case of leprosy has become arrested the progress of leprosy was inhibited in a number of cases and promin is the sulphonamide drug which thus far seems to possess to the greatest extent some chemotherapeutic properties against leprosy.

L. Rogers

DE CAIRES P. F. Iron Therapy in Severe Cutaneous Leprosy *British Guiana Med Ann* 1943 132-6 1 chart

The author has been making routine estimations of the haemoglobin in the blood of patients with leprosy at the Mahaica Leprosy Hospital British Guiana. In lepromatous cases in an advanced stage it averaged only 50.75 per cent against 85.24 per cent in a control group of healthy non leper attendants. In able bodied patients of all types it averaged 62.85 per cent in children with active symptoms 62.55 per cent and in recovered cases it was from 68.69 per cent to 72.55 per cent. Cases with septic complications were excluded from the estimations and hookworm infestation was also absent. These observations led to the administration of Ferri et Ammon Citras in 30 gr doses three

times a day with beneficial results in addition to the routine anti-leprosy treatment by injections of hydnocarpus esters I Rogers

HELMINTHIASIS

EIGENFELD D D & SCHLESINGER C J An Improved Flotation Method for the Recovery of Ova from Feces *J Amer Vet Med Ass* 1944 Jan v 104 No 802 26 1 fig

This is a simple contrivance to enable the surface layer containing the ova to be collected easily and completely. The floatation tube has a side outlet in its upper part through which the surface layer overflows

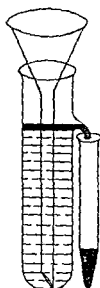


Illustration of the floatation tube for collecting the film
[Reproduced from the *Journal of the American Veterinary Medical Association*]

when it is raised by the addition of more floatation fluid through a funnel as shown in the diagram. Distilled water is added to the centrifuge tube which is then centrifuged and the deposit examined for ova

J F Corson

PITTA SIMOES J M & HILL R B Resultado dum inquerito sobre a infestação por helmintas das crianças de Aguas de Moura [Helminth Infestation of Children in Aguas de Moura] *An Inst Med Trop* Lisbon 1943 Dec v 1 No 1 97-104 [11 refs] English summary

A survey on the infestation of children up to 15 years of age was carried out in Aguas de Moura. All children in the locality were

examined and it was found that out of 115 children observed 16 were infested

As in 4 children more than one species of parasites was found the number of cases comes up to 21

According to the species of the parasites the distribution of the cases is as follows —

<i>H nana</i>	10 case
<i>T trichiura</i>	8
<i>E vermicularis</i>	2
<i>A lumbricoides</i>	1

MILLER J J Jr & WILBUR D L Paragonimiasis (Endemic Hemoptysis) Report of 3 Cases U S Nav Med Bull 1944 Jan
v 42 No 1 108-17 2 figs

The authors have diagnosed by finding the operculated eggs in fresh unstained sputum three cases of infestation with *Paragonimus westermani* among members of the United States Naval and Marine Corps returning from the South Pacific (Samoa Solomon Islands). Since this paper was written they have diagnosed in the same way four other cases from Samoa which showed characteristic pulmonary symptoms

After discussing the life history of the parasite and the pathology and symptoms of paragonimiasis the authors describe the three cases just referred to. The striking clinical features were similar in all three namely persistent chronic cough pain in the chest and expectoration of several ounces of very sticky colourless sputum containing small brown flecks. Only one of the three subjects an officer aged 23 showed haemoptysis. Before he left the United States he had had a fall from a horse and then coughed up blood on one occasion. Four months after his arrival in Samoa where he underwent a period of intensive training in the jungle and underbrush he began to complain of cough weakness and pain in the left leg and lower half of the chest. He coughed up brownish material and later blood until he fainted after a haemoptysis of about 500 cc. Subsequently while he was on a transport he coughed up occasionally as much as 200 cc of blood. Under treatment with emetine he was at the time of writing slowly recovering.

This patient showed a type of pain in the chest which is unusual in the authors experience of such cases. It was deep in the chest difficult to localize constant made worse by severe cough but not by breathing and was partially eased by immobilization of the chest by strapping. X ray examination revealed a lesion at the base of the right lung simulating bronchiectasis. Another striking feature of this case was a persistent thrombo phlebitis of one leg with constant pain in the tibial region accompanied by hyperaesthesia over the same region. Another of the patients had pain in the left knee thigh and inguinal region attributable to thrombo phlebitis with some oedema. He also had enlargement of the superficial abdominal veins suggesting obstruction of the inferior vena cava and possibly of the portal vein.

The disease is rare in the United States and all of the few cases known have been in persons who have lived for some time in the Orient. Human or other mammalian infection results from eating raw or improperly cooked crab or crayfish.

Paragonimus is found in New Guinea the Dutch East Indies
India China Indo-China Malaya the Philippines and in
Korea Japan and Formosa Cases have also been reported from West
Africa G Lapage

KEVORKOV \ P [Some Critical Remarks about the Epidemiology and
Epizootology of *Hymenolepis Infection*.] Med Parasit & Parasitic
Dis Moscow 1943 v 12 No 2 80-83 [In Russian]

The author summarizes briefly some of the world literature on the question whether *Hymenolepis nana* of man and *H. murina* of mice and rats are the same species. Much work has been done on this question in the U.S.S.R. With SCHLEICHER the author examined in Tashkent 125 rats (*Rattus turkestanicus* the only species of rat found in Uzbekistan). Of these seven (5.6 per cent) had *H. murina*. During the same period of years it was found that 1.6 per cent of 188 mice (*Mus musculus* house mouse) examined had *H. murina*. A table summarizing the percentages of rats and mice harboured in various parts of Russia (e.g. Moscow, Don Basin, Odessa, Kharkov, Tashkent) shows that rats are much more heavily infested than mice. The work of the author and of other Russian workers indicates that there is little coincident infestation of man and rodents with *Hymenolepis* in various parts of Russia. Don this does occur in some regions. CHANDLER gives two reasons for this lack of correspondence between the infestation with greater difficulty in civilized towns than in places where hygiene is primitive (e.g. India). First he thinks that man gets the infestation with greater difficulty and second that the eggs of *Hymenolepis* are sensitive to cold and quickly perish in moderate climates whereas rats easily infest each other by coprophagy. Discussing his own and other criticisms of these views the author records his experiments in collaboration with REPRIN which showed that the eggs of *Hymenolepis* dried up under the conditions prevailing in Tashkent in 5-15 minutes. Their conclusion as that higher temperatures are more harmful than lower ones to the eggs. The author concludes however that man can become infested with *Hymenolepis* from the rat which can act as a reservoir of the infestation G Lapage

KEVORKOV \ P On some Problems of the Treatment of *Hymenolepis*
Infection. Med Parasit & Parasitic Dis Moscow 1943 v 12
No 2 83-8 [In Russian]

Remarking that tens or even hundreds of thousands of specimens of *Hymenolepis nana* may occur in a human patient especially in children the author says that one treatment may be sufficient only in exceptional cases and that 3-5 treatments (with Filxmas) may not expel all the parasites. This unsuccessful treatment is due he thinks first to the position of the parasites in the lower third of the small intestine and to the mechanism of the movement of the contents of this part of the intestine. In 1930 he himself swallowed eight gelatin capsules filled with barium and found by means of X-ray photographs that the capsules opened in the stomach but that the barium travelled very slowly down the small intestine. When dogs were given bread and magnesium sulphate to evacuate the intestine and then male fern extract it was found at post mortem that in one dog given 2.0 gm [?]

the male fern travelled 180 cm from the pylorus in $3\frac{1}{2}$ hours in another given 1 0 160 cm in 2 hours 10 minutes in a third given 1 0 120 cm in $3\frac{1}{2}$ hours and in a fourth given 8 0 132 cm in 2 hours 10 minutes. He calculates that children aged 5-7 years have a small intestine 483 cm long they are given a dose of 1 0 of male fern at the age of 13-14 it is about 500 cm and they are given 2 0 of male fern. In both cases the male fern will not get in the course of $3\frac{1}{2}$ hours to the end of the small intestine. A further 3 metres of intestine remain which cannot be reached by the extract in time. Even if there were time less and less of the extract is available as it progresses down the intestine. Its slow progress depends not on the quantity given but on the peristalsis and on the tendency of the extract to adhere to the walls of the intestine.

Experiments show moreover that we cannot kill all the parasites when their numbers are so great because for the reasons given only relatively small amounts of the extract get to the lower parts of the intestine where most of the parasites are. Clinical study of cases shows that there may be no symptoms at all and the question then arises whether the male fern may not cause greater damage (to the heart muscle) than the parasites are causing. When however there are symptoms subjective or objective we should treat the cases. The author has found that the fractional dose method of PODIAPOLSKAYA for giving male fern produces the quickest effect in comparatively small doses. [No details of this method are given.] As regards prophylaxis it is doubtful whether we know enough about the epidemiology of the infestation to carry this out satisfactorily.

G Lapage

IONINA N C [The Clinical Study and Treatment of *Hymenolepis* Infection] *Med Parasit & Parasitic Dis* Moscow 1943 v 12 No 2 95-6 [In Russian.]

After treating 37 cases of infestation with *Hymenolepis nana* (4 were adults 3 children aged 14-15 22 children aged 10-13 and 8 children aged 5-9) the author concludes that the efficiency of the treatment with male fern by standard methods is not great (24.1 per cent in his experience). The efficiency of treatment with pumpkin seeds is still less (14.2 per cent in his experience). A new method of treatment is required. The author worked in the Tadzhik province (Uzbekistan).

G Lapage

HEILIC R & VISVESWAR S K Does a Hookworm Toxin exist? *Indian Med Ga* 1943 Dec v 78 No 12 578-83 [18 refs.]

Discussing the causation of hookworm anaemia the authors agree that loss of blood is certainly one factor but point out that the severest anaemia may occur when there is apparently only a minute loss of blood. Malaria malnutrition faulty food habits and multiple infections might depress the haemopoietic activity of the host so much that even small amounts of blood could not be replaced especially when protein and iron are not supplied or utilized in sufficient amounts. It has been suggested that a toxin produced by the hookworms also operates which either paralyzes the bone marrow or causes haemolysis or does both. But it has been definitely shown that there is no increased blood destruction. The idea that there may be an aplastic

anaemia due to the action of a hookworm toxin on the bone marrow is unlikely because if it is true that iron arsenic etc cannot exert any effect on an aplastic anaemia hookworm anaemia cannot be of this type no anaemia responds so promptly to iron treatment.

Heilmann this Bulletin 1943 v 40 p 68 has however found that in 6 out of 65 cases of hookworm anaemia there was no improvement of the heart condition under iron treatment until de-worming was complete although there was considerable increase of haemoglobin and of the numbers of erythrocytes. When however de-worming is complete in such cases the heart condition improves quickly even when the haemoglobin values and the number of the erythrocytes remain constant. He concluded that the anaemia and the heart condition are caused by different factors that the anaemia is not necessarily the cause of the heart condition and that something directly connected with the presence of hookworms prevents the heart improvement even when abundant iron reduces the effect of the parasites on the blood.

To test this idea the author took 26 patients with severe hookworm anaemia and no other active disease. Massive doses of iron (90 grams of iron daily in the form of Bland's pills) were given. When the haemoglobin reached 35-40 per cent (Sahli) de-worming was done with carbon tetrachloride and oil of chenopodium. The iron was stopped from the day before de-worming until the end of the experiment so that any changes observed could be regarded as not being due to the iron medication. Haemoglobin estimations and enumerations of erythrocytes were made every week. Electrocardiograms were taken three times before treatment on the day before de-worming and one week after de-worming. At the same times blood serum was taken and used for perfusion isolated frog's hearts. This was done by independent workers using Gunn's modification of Trendelenburg's method. It could only be done with the sera of 14 of the 26 patients. The results are tabulated and discussed. A well marked reduction of the amplitude of the beat of the frog's heart sometimes visible by direct observation was recorded but the paper should be consulted for details of this aspect of the experiment.

The authors claim that it is possible to distinguish between the effect of hookworm anaemia and the effect of another factor toxic to the heart muscle. There is no doubt they think that iron treatment and blood regeneration cause a very considerable improvement in the myocardium and reduce or abolish in a high percentage of cases the depressant effect of the serum of hookworm patients on the frog's heart. But in a minority of cases although improvement occurs after de-worming it does not occur after anti-anaemic treatment a fact which suggests the presence in the blood of a myocardiotoxic factor connected with the presence of the hookworm. When improvement occurs in spite of the action of this factor it is due to overcompensation of its effects by blood regeneration.

The least probable explanation of this factor is to call it a chemical toxin produced by the worms. It is more probable that it is a toxin in the serological sense and are reminded that antibodies have been found in the blood of dogs infested with *Ancylostoma caninum*. If this view is correct iron therapy or increased haemopoiesis would stimulate antitoxin production so that all toxins would be neutralized in a majority of cases. In a minority perhaps because of weakness of the reticulo-endothelial system some unneutralized toxin would

remain so long as some worms remained and this would prevent recovery of the myocardium and maintain the depressant effect of the serum demonstrated by the perfusion of the frog's heart although it could not suppress the blood improvement

The existence of an anti haemopoietic toxin has not been proved and is improbable

G Lapage

CAETANO DA SILVA JUNIOR J A & FLOSI A Z Sobre um caso de meningopatia secundária e ascariíose [A Case of Meningitis Secondary to *Ascaris* Infection] *Rev Neurol e Psiquiatria de São Paulo* 1949 Sept-Oct v 8 No 5 183-6

CLAVEAUX E SALAFRACIO F J MAGNONI P & CANZANI R Estudio clínico epidemiológico de un foco de triquinosis [A Clinical and Epidemiological Study of an Outbreak of Trichiniasis] *Primer Congr Nac Enfermedades Endemo Epidemicas Buenos Aires 1942 Nov 9-13* 517-37

The authors describe in detail an outbreak of trichiniasis at Pueblo Soca 60 kilometres from Montevideo. Brief histories of 69 cases are given and the symptoms and differential diagnosis are discussed. None of the patients died. All the symptoms and signs discussed have been reported in this *Bulletin* in recent abstracts of papers on outbreaks in Germany and elsewhere. Among the gastro intestinal symptoms special attention is directed to the boiled tongue (from its resemblance to boiled meat) seen during the febrile stage to the anorexia and attacks of gastro intestinal atony with flatulent crises. No serious cardiovascular or urinary symptoms were seen and the nervous system was affected in only two cases. One of these slowly developed 96 days after the onset of the illness progressive unilateral paralysis of the face which began with disturbance of taste and transitory diplopia after 45 days it had disappeared. The other had for 15 days marked loss of strength in his arms with decreased tendon reflexes and some zones of anaesthesia these also disappeared completely. Transitory acute pulmonary symptoms with eosinophilia suggesting Löffler's syndrome were very common and should suggest search for *Trichinella*. Cases with pulmonary signs are divided into (1) those with areas of transitory consolidation of the lung with rise of temperature cough and expectoration of muco-purulent or sanguineous sputum free from acid fast bacilli and (2) those with pleuritic signs especially at the base of the thorax. These explain the thoracic pain of some cases and may correspond to localization of the infestation at the insertions of the diaphragm. The blood showed extraordinarily high eosinophilia which rose in some cases to 50 or 60 per cent and in one case to 72 per cent with 20 000 leucocytes per cmm. This eosinophilia like the clinical signs persisted for weeks or months. The number of leucocytes varied in patients with marked clinical symptoms there was usually a leucocytosis of 15 000-25 000 per cmm two showed a moderate leucopenia and in others there was a normal number of leucocytes. In some cases transitory positive serological reactions suggested syphilis and two cases had been so diagnosed. Patients whose blood serum gives positive results in Wassermann or Kahn tests and who have no history of syphilitic infection should be examined for *Trichinella*. In some cases the allergic signs urticaria transitory oedemas joint pains eosinophilia etc may be the only signs and in many cases symptoms

are so slight that they escape diagnosis. Probably there were many of these in the local population which were not seen. The infestation was found in the families of most of the patients seen and also in the children of a local public school. The epidemic began at a time when pork from uninspected sources was being largely consumed in Pueblo Soca but the source of the infestation was not found nor was *Trichinella* found in the local rats examined. All examinations of the blood, faeces and excised muscle were negative. No precipitin tests were done but the intradermal test of Bachman done on seven cases was positive in all and negative in 33 control except three one of which had a heavy infestation with *Trichuris* (roup reaction) the other two having symptoms suggestive of trichiniasis. Brief reference is made to other cases noted in Argentina, Santa Fe and Uruguay. In five cases subcutaneous nodules smaller than a grain of maize occurred all at about the same time (at the end of the illness) and all at the level of the insertion of the external border of the rectus abdomini into the costal margin. From this they apparently migrated for about 5 cm in various directions their track being marked by a fibrous cord slightly tender to pressure.

G. J. J. J.

WRIGHT W. H., KERR K. B. & JACOBS L. Studies on Trichinosis. XV. Summary of the Findings of Trichinella in a Random Sampling and other Samplings of the Population of the United States. *Public Health Rep.* Wash. 1943 Vol. 58 No. 33 1293-313 [22 refs.]

This paper is reviewed in *B. J. H.* 1943 19 201

DEFICIENCY DISEASES

ILLIENFF C. A. Evidence of Vitamin B Deficiency in Orange Free State Natives. *Southern African Med. J.* 1943 Dec 20 Vol. 17 No. 24 375-6 4 charts

Of 4,600 natives of the Orange Free State examined clinically, remarkable vitamin B deficiency was found in 19 per cent. These figures take no account of subclinical deficiency. The condition was not common in children or pregnant women and males were affected more frequently than females in the proportion of 3:2. The only aetiological factor appears to be a deficient diet. These natives live chiefly on maize and the majority of the affected persons (75 of 86) used a refined maize meal from which the hull and a portion of the germ had been removed. Animal products, vegetables and fruits are rarely taken. Nevertheless the great bulk of the population subsists on this diet supplemented by native beer yet only a proportion show signs of deficiency. In general the people appear to be fit and active and by no means ill. The energy value of the normal diet is about 2,000 calories with a carbohydrate-protein-fat ratio of 16:2:1. It seems probable that some other factor is necessary to precipitate overt deficiency disease and the author speculates on the effect of intercurrent disease (alcoholism, diarrhoea, sprue and cirrhosis of the liver) and other factors. [The reference to sprue is interesting but no details are given.] MAXSON BAHR (*The D. senteric Disorders* 2nd

Edition 1943) notes that few authentic cases have been reported from Africa but quotes one from Nyasaland.] He points out that the use of beer did not prevent avitaminosis in 36 patients accustomed to take it.

Pellagra (30 cases) is frequently seen beriberi (4) rarely. In addition there is a condition resembling tabes dorsalis and another in which various skin manifestations occur alone or associated with pellagra or beriberi. A characteristic anemia is also found. This and the neurological condition are to be described later. In pellagra the gastro intestinal symptoms are not prominent but anorexia is common. Mental changes are much in evidence and symmetrical skin lesions frequently seen. Skin lesions other than those associated with pellagra are described — areas of pigmentation and desquamation on the anterior aspect of the forearm the abdomen cheeks and forehead. Keratosis and pigmentation of the dorsum of the forearm just below the elbow. Eczematous patches at the angles of the mouth with conjunctival hyperaemia are regarded as signs of riboflavin deficiency. These skin conditions are successfully treated by Marmite or other substances rich in vitamins of the B group.

Charles H Wilcocks

- i WATSON C J & LAYNE J A Studies of Urinary Pigments in Pellagra and other Pathological States I Clinical Observations *Ann Intern Med* 1943 Aug 19 No 2 183-99 [44 refs]
- ii LAYNE J A & WATSON C J Studies of Urinary Pigments in Pellagra and other Pathological States II The Excretion of Porphyrin and the Urorosein Reaction in Dogs with Experimental Blacktongue *Ibid* 200-205
- iii SCHWARTZ S MARVIN J F LAYNE J A & WATSON C J Studies of Urinary Pigments in Pellagra and other Pathological States III Certain Toluene Soluble Pigments of Human and Canine Urine *Ibid* 206-12 5 figs

In a previous communication Watson pointed out that the Ellinger Dojmi colour reaction is due to urorosein and that porphyrin although capable of yielding colour if present in sufficient amounts was not the source of the positive reactions encountered in urine samples from a variety of conditions including pellagra. BECKH ELLINGER and SPIES had employed this reaction for the quantitative estimation of porphyrin in the urine. They stated moreover that the administration of nicotinic acid was followed by a prompt fall in the excretion of urinary porphyrin to normal levels. This led to a considerable literature all based on false premises.

In the present three communications the urinary pigments in pellagra etc. are put on a proper basis. The authors' conclusions are as follows —

1 The chromogen of the urorosein reaction is a normal constituent of the urine of many individuals who have no clinical evidence of nicotinic acid deficiency. The available evidence indicates that this chromogen is indol acetic acid.

2 The development of the urorosein reaction either by the method of Nencki and Sieber or that of Beckh Ellinger and Spies requires the presence of nitrite or a similar oxidizing agent. Substances of this type are native to urines which exhibit spontaneous reactions. The exact nature of these native substances remains to be determined.

3 No definite correlation has been noted between the presence and disappearance of either chromogen or oxidizing agent with the deficiency or administration respectively of nicotinic acid. The result of the present investigation indicate however that spontaneous reactions (without addition of nitrite) occur only in association with disease and much more frequently in subjects having deficiency states.

4 The Ellinger Dojmi color reaction on which the B.E.S. test is based is not at all specific for porphyrin and in our experience has always been due to uroporphyrin.

5 The development of a red color in the toluene preservatives of pellagra urine also of urines from certain patients with malnutrition of one cause or another could not be correlated with other evidence of nicotinic acid deficiency. This pigment has not been observed to develop in urine of normal individuals.

6 1 The spontaneous uroporphyrin reaction was consistently negative in urine samples from dogs having experimental black-tongue.

2 The appearance of red color in the toluene preservatives of dog urines was not correlated in any way with nicotinic acid deficiency.

3 There was no significant increase in coproporphyrin excretion in dogs with black-tongue or that observed during the control periods.

4 1 The red pigment extracted by toluene from certain human and canine urines (papers II and III) has been shown by means of chromatographic analysis to be composed of several similar pigments.

2 Two pigments each from human and canine urines were found very similar to but not identical with synthetic indirubin. On the basis of chromatographic analysis and spectral distribution curves the latter was likewise shown to be a mixture of related pigments none of which was entirely identical with any of those from the urine.

H. S. Stannus

HAEMATOLOGY

FAWDEY A. L. Erythroblastic Anaemia of Childhood (Cooley's Anaemia) in Cyprus. *Lancet* 1944 Feb 3 171-6 2 figs 1-1 ref 1

The characteristics of the disease described by COOLEY were a chronic and ultimately fatal anaemia of early onset in children of Mediterranean stock with splenomegaly, peculiar bone changes most conspicuous in the skull, a familial incidence, the presence of large numbers of nucleated erythrocytes in the peripheral blood and a monoloid facies which is due partly to changes in the bones of the face and partly to the pallor of the skin. Since the time of the original description similar syndromes have been found in which one or more of the above features may be absent.

An analysis of 20 cases seen in Cyprus in 2½ years showed a preponderance of the disease in males a febrile onset a history of earth eating no mental retardation despite gross physical changes mongoloid features constant but of varying degree cardiac enlargement radiologically demonstrable bone changes with thickening and distinctive radial striation of the calvarium although this was not constant. The subjective severity of the disease was entirely a function of the degree of the anaemia which was remarkably constant over long periods. It appeared to lack correlation with the age of the patient date of onset of the disease bone changes or numbers of nucleated erythrocytes. The anaemia was always hypochromic and of the nucleated erythrocytes in the peripheral blood the vast majority were normoblasts although in most cases there was a small proportion of more primitive cells target cells [erythrocytes with lightly stained zone between deeply stained centre and periphery] were present in 50 per cent of patients. Bone marrow films showed an enormous preponderance of normoblasts and the cells of the red cell series were about six times as numerous as all the white cells.

No evidence was obtained that the disease was due to malaria or leishmaniasis or that it was secondary to rickets tuberculosis gastro intestinal disturbance or syphilis. Although the red cell fragility was not examined the absence of icterus the low colour index and the degree of poikilocytosis served to differentiate the disease from familial haemolytic icterus. The large numbers of circulating nucleated erythrocytes the enlargement of liver spleen and lymph glands the bone changes and the excessively erythroblastic marrow distinguish it from iron deficiency anaemia. Furthermore none of the cases showed the slightest improvement when iron was given by mouth. Blood transfusions and liver extract also produced only inconstant and transitory improvement. There was no evidence of any association with pernicious anaemia or of any defective absorption of a haemopoietic factor. Although there is obviously a need for a precise study of the Rh antigen in families affected with Cooley's anaemia the interval between birth and the onset of the illness makes it unlikely that there is much in common between the disease and erythroblastosis foetalis.

The cause of Cooley's anaemia is quite obscure. Some intrinsic defect of the haemopoietic tissues has been favoured by most as the likely aetiological factor but the responsibility of an infective organism or the deficient absorption or utilization of some haemopoietic substance cannot be ruled out. If the blood changes are inexplicable in the present state of knowledge the bone changes are even more so. Among the suggested factors involved in the latter are the mechanical disturbance of the bone architecture by the hyperplastic marrow the development of bone over a long period in surroundings where the supply of minerals and vitamins is probably adequate but that of oxygen deficient and the close physico chemical interrelationship of ionic calcium and ionic iron in view of their competition for phosphate in the intestinal tract.

F Murgatroyd

EVANS R W The Sickling Phenomenon in the Blood of West African Natives *Trans Roy Soc Trop Med & Hyg*, 1944 Feb v 37 No 4 281-6 1 fig [10 refs]

The incidence of the sickle cell trait was investigated in approximately 600 West African natives. Various techniques were used

in some cases capillary blood was examined after standing at room temperatures for up to 36 hours in vaselined sealed cover glass preparations while in others venous or finger blood was withdrawn into citrate solution placed immediately under liquid paraffin and after standing for 24 hours the cells were fixed by the addition of 10 per cent formaldehyde in saline. No significant differences were observed in the result obtained by the two methods. Blood obtained by sternal puncture was also examined. Tests for sickling *in vivo* were also made by drawing blood into paraffined syringes and placing immediately in 10 per cent formal saline under liquid paraffin.

When sickling the cells first expand then assume a spheroidal shape after which they become transformed into the multi pointed sickle form. In capillary preparations the reticulocytes took longer to sickle than did the more mature erythrocytes.

In some instances the cover glass examinations were made on slides on which previously a 1 per cent solution of brilliant cresyl blue in 90 per cent alcohol had been spread and allowed to dry. It was confirmed that the dye inhibited the formation of sickle cells. One case in which normally 90 per cent of the cells sickled in 15 minutes showed in the presence of the dye no sickling after 6 hours and only 15 per cent of the cells were sickled in 12 hours.

Of 224 West African native soldiers from Nigeria 27.3 per cent had erythrocytes which sickled *in vitro* of 138 from the Cameroons the percentage was 15.9 of 132 from the Gold Coast it was 16.6 and of 67 from the Gambia the figure was 23.3 per cent. It may be assumed therefrom that the incidence of the trait in British West African male natives is about 20 per cent, which figure is roughly three times as high as that found for American coloured patients by various workers. Six cases of sickle-cell anaemia of which four were fatal were included among Gambian natives. The high figure for Gambian soldiers may be due to the relatively small number examined and to the high degree of inheritance. Excluding patients considered to be suffering from sickle cell anaemia the mean red cell count of the soldiers whose blood showed the sickle-cell trait was 4 100 000 erythrocytes per cmm and that of those not showing the trait 4 200 000.

In a small group of 46 males and 23 females mostly members of one large family (Boja :) in a Gambian village the total incidence of the sickling trait was 18.8 per cent with an incidence of 22 per cent among the males and only 13 per cent among the females. In this group one family representing the parental first and second filial generations respectively and comprising 12 males and 10 females gave figures of 5 for the males and 1 for the females. Thus of the remaining 47 members of the group (34 males and 13 females) only 15 per cent had cells which sickled, which is of interest as the trait is inherited as a Mendelian dominant character.

Subdividing the soldiers it was found that among 259 suffering from chronic disease the incidence of sickling was 25 per cent while among 302 fit soldiers and those suffering from injury or gonorrhoea the incidence was only 15.5 per cent. A further analysis of the former sub-group revealed the highest incidence to be among 46 patients suffering from respiratory diseases in whom the incidence of sickling was 28.3 per cent. No significant variation from the figure of 25 per cent was found for any other group of diseases.

F Murgatroyd

ENGLISH R B A Note on the Occurrence of the Sickle Cell Trait in the Blood of a Bantu *South African Med J* 1943 Dec 25 v 17 No 24 389-90

The author states that though the sickle-cell trait is confined almost entirely to negroes and half whites and has been found in certain white races it has not hitherto been reported in the Bantu. He records a case in a young adult male Bantu of a tribe originating in Angola. The trait was not present in two persons alleged to be brother and sister of this man.

Charles Wilcocks

VENOMS AND ANTIVENOMS

BOVET I & BOVET D Application de la methode de Warburg à l'étude de l'action esterisique du venin de cobra [Warburg's Method for studying the Action of Cobra Venom on Esters] *Ann Inst Pasteur* 1943 Sept-Oct v 69 No 9-10 309-12 3 figs

DELEZENNE and FOURNEAU have shown that cobra venom hydrolyses lecithin and sets free lysocithin, a hæmolytic substance by a sort of ferment action. The venom acts rapidly on yolk of egg but very slowly on pure lecithins prepared from it. The former being a complicated reaction the authors have studied the more simple hydrolytic activity of the venom on other glycerin esters or choline in the present contribution on acetylcholine. To this end they have used the manometric method of Warburg. They find rather unexpectedly that the rapidity of the reaction is within wide limits at least independent of the concentration of the acetylcholine. A graph shows that the hydrolysis is just as rapid at the beginning with a concentration of 1/250 as one of 1/2 500 there is no latent period. Another peculiar feature is the relative independence as regards temperature at which the reaction is carried out. The rate was the same at 20 ° as at 37 °C.

Some authorities state that Ca ions favour the action of venoms on lecithin but the authors found nothing to confirm this.

The question of inhibition of the diastatic effect of venoms is of much interest but say the authors it has not been investigated. They have now shown that eserine has such an action inhibition being almost total in a concentration as low as 1 in 2 000 000. Methylene blue has a similar effect but at a higher concentration 1/1 000.

The authors conclude that the venom contains more than one esterase on the grounds that the action on choline esters takes place at concentrations one hundredth that on egg yolk or triacetin and that eserine inhibits the action of the venom on acetylcholine without impeding diastatic hydrolysis of triacetin and lecithin.

H Harold Scott

DERMATOLOGY AND FUNGUS DISEASES

MERRILL E. D. Dermatitis caused by various Representatives of the Anacardiaceae in Tropical Countries. *J Amer Med Ass* 1944 Jan. 22 v. 124 No. 4 222-4

This is an interesting sequel to the article on Dhobie Mark Dermatitis previously abstracted in this *Bulletin* 1944 v. 41 230-231. Anacardiaceae are widely distributed and it is a peculiarity of them that though they are contact poisons they produce fruits which are sought after and may be eaten with impunity—many mangoes for instance. Only certain species of *Mangifera*, *Senecarpus* and *Anacardium* members of the Anacardiaceae are poisonous. The use of the sap for making lacquers is due to the milky product becoming brown-black on exposure to the air. This sap is present in all parts of the plant or tree and is not always irritating on contact but develops this property later and highly allergic persons may show a dermatitis on coming into contact with old furniture lacquered with it. Some persons also are known to develop a rash from eating mangoes, others develop dermatitis from coming into contact with the fresh leaves or after taking shelter under the trees in a shower but generally it is the sap itself which is responsible.

The remainder of the paper refers to plants other than those belonging to the Anacardiaceae which may set up dermatitis such as the Manchireel apple and the stinging hairs of *Jatropha* and of *Macuna*.

H. Harold Scott

DAVIS E. L. Mycotic Ear Infections at an Advanced Allied Base
Med J 4 June 1943 No. 27 v. 2 No. 22 437-8

Ten to twenty patients with mycotic or fungous infection of the external auditory canal were seen at an advanced allied base in the tropics during June and July 1943. Of these ten showed coexistent fungous infection of the glabrous skin on other parts of the body. It was possible to submit material for pathological investigation on only 16 of the cases but the specimens from 11 of these revealed the presence of mycelium and spores. The material consisted of the waxy detritus and skin flakes syringed from the external meatus. About half of the specimens were greenish in tint owing to the presence of *Pseudomonas*. The first stage of the disease is not often seen at clinics for there is then but soreness and tenderness on contact with pain during chewing. Local examination at this stage reveals no obvious changes but the external canal becomes red and inflamed during the next phase whilst the canal is coated with a soft moist sebaceous like detritus. In the third stage the walls become swollen so that the canal may be obliterated. The pain tends to be worse at night and there is moderate pyrexia. In treatment a preliminary ear toilet was carried out, the ear was syringed and swabbed with spirit. Glycerin and ichthyol (10 per cent) tampons were then inserted. The routine was carried out for three or four days by the end of which the acute stage had subsided. Subsequently the canals were daily swabbed with spirit as before then painted with Castellani's carbolic fuchsin. Healing occurred after another four or five days.

Sidney Thomson

EARNshaw H A Method of Treatment of 'Tropical Ear' *Med J Australia* 1943 Nov 27 v 2 No 22 438-9

Attention is drawn to the various synonyms Singapore ear Panama ear surfer's ear hot weather ear otitis externa diffusa and desquamative external otitis. The treatment here described has been successfully used in nearly 200 cases and the average length of time required to effect a cure was twelve days. Most patients first present themselves when there is oedema of the meatus. The canal is at once packed really tightly and under direct vision with half inch ribbon gauze. This is excruciatingly painful and may require light ethyl chloride anaesthesia although most cases can be tackled if one third of a grain of morphine be injected hypodermically one hour before the operation. The author insists that it is the pressure which is important and that ichthyol and glycerine are no more efficient than other medicaments. The formula here recommended for use on the packing and as drops is a 5 per cent suspension of mercuric ammonium chloride in liquid paraffin. The packing is left in place for forty eight hours the gauze being moistened twice a day with the above drops. When there is much debris the canal must be cleansed as efficiently as possible before proceeding with the subsequent routine treatment. This cleansing can be effected by syringing with a sodium bicarbonate solution immediately followed by spirit so that the canal is dried. Thereafter the drops are used three times a day care being taken that they reach the tympanic membrane. No packs or plugs of any kind are inserted at this stage. Excoriations may be treated with the following ointment—

Hydrarg Ammon	24 grains
Zinc Oxid	1 drachm
Amyl	1
Paraff Liq	1
Adip lan hydros	1 ounce

Most of the pain and much of the discharge disappear two days after the drops and ointment have been started. *Sydney Thomson*

TROPICAL OPHTHALMOLOGY

A REVIEW OF RECENT ARTICLES XLIII*

Trachoma—GURD¹ prefaces an account of the features of trachoma as it occurs in the Maltese Islands with a useful and comprehensive review of the disease in general. His observations are based mainly upon the examination of Maltese recruits for the Services and 1 600 of these were seen. Five per cent of them—dock yard labourers and conscripts—showed signs of the disease. a number of those affected however were free from subjective symptoms and were quite unaware that they had any eye trouble. The author states that The disease is not taken

For the 4th of this Series see Vol 40 pp 941-943

¹GURD D P An Investigation into the Incidence of Trachoma in the Maltese Islands its Early Diagnosis and Mode of Spread with special application to the Armed Forces. *J Roy Nav Med Ser* 1943 July & Oct v 29 Nos 3 & 4 171-82 37-39

very seriously by the people themselves. It is for the most part very mild in character and gives rise to few distressing symptoms except when infection by secondary organisms supervenes. With regard to secondary infections the *Staphylococcus—albus or aureus*—appears to be the most common and diplobacillary infection to be the next most important. Early diagnosis is based upon the presence of tiny greyish round follicles in the tarsal conjunctiva of the upper lid especially at the upper margin of the tarsus. These form round pale eminences with conjunctival vessels running round their bases. Tiny petechial spots arranged in small plume like clumps in a somewhat oedematous conjunctival membrane may also be seen. Corneal vascularization by invasion of the limbic vessels is revealed by the slit lamp and thus constitutes an essential element in the diagnosis of the disease. It must be borne in mind that the limbal vessels may become more evident in conjunctival irritation from any cause. In trachoma however the vascularization is irregular the extension of the terminal loops is peculiar and foci of corneal infiltration are present.

Except during January and February there is little or no rainfall in Malta and sunshine glare and dust laden winds are prevalent. A limited water supply is another factor predisposing to conjunctival inflammation. No case of entropion with trichiasis was observed among the recruits examined. Although this complication is common in Malta it is only found in middle aged or elderly persons of the poor classes and is stated to be invariably associated with dental sepsis. Trachoma in Malta shows a very marked class incidence and affects only the lower strata of society.

Thorough application of a copper sulphate pencil proved satisfactory in the treatment of the more advanced cases of the disease. Oral administration of sulphonamides was found to have no influence on the trachoma but was beneficial in regard to secondary infections. The local application of 5 per cent. prontosil ointment is stated to have given good results when the cornea was affected.

An article in the *Royal Naval Medical Bulletin*² also deals with this subject and makes the same points. Stress is laid upon the importance of early diagnosis by use of the slit lamp and by examination of scrapings from the conjunctiva. Many Maltese serve as officers stewards and there is a danger that they may spread the infection should they suffer from the disease.

STYLIANAKIS³ reports favourably on the treatment of trachoma by prontosil. He states that the drug has proved its value and that its superiority over older methods of treatment with silver nitrate and copper sulphate is established. It has the advantages of being painless and capable of use in home treatment and its use involves no injury to the lids by manipulation. In the later stages of the disease when corneal complications are met with he advises that the drug should be given by intramuscular injection supplemented by oral administration of 3-6 tablets. A lotion of 5 per cent. prontosil has been found effective.

Xeroderma lacia—The part played by vitamin A deficiency in the causation of eye disease and blindness in Bengal has been the subject

ROY NAV MED BULL. 1943 N 4 6-13 Trachom Malta

STYLIANAKIS V G Im Antitrachom Ambulanz im d. Hypotrichum in Canaan. Bericht über Beobachtung und Behandlung der Trachom-Chemotherapie mit Prontosil. *Deut. Tropenmed. Zeitsch.* 1943 Apr 1 v 47 No 7 161-9

of a clinical investigation by KIRWAN SEN and BOSE⁴ Night blindness xerophthalmia and keratomalacia constitute the signs of a faulty nutrition Night blindness of course is not in every case due to vitamin deficiency but may be caused by various local morbid conditions Glare by its action on the visual purple is a factor in the causation of nutritional night blindness the regeneration of the purple exhausted by exposure to strong light is probably delayed or hindered when the diet is deficient in vitamin A Some observers consider that conjunctival pigmentation is an early and characteristic sign of vitamin deficiency whilst others are of opinion that this pigmentation even when associated with Bitot's spots is not necessarily a sign of such deficiency Xerophthalmia is a degenerative condition characterized by dryness of the conjunctiva due to changes in the epithelium which impair secretory activity and these changes respond to treatment with cod liver oil Xerophthalmia and keratomalacia can be produced in animals by feeding them on a diet deficient in vitamin A Clinically a loss of conjunctival lustre can be observed most marked on the temporal side and a wrinkling of the bulbar conjunctiva occurs when the eyeball is rotated Small white triangular spots appear on the temporal side of the limbus in the portion of the bulbar conjunctiva exposed by the palpebral aperture These spots become covered by foam like products of Meibomian secretion (Bitot's spots) Keratomalacia is described as an advanced stage of xerophthalmia Impairment of corneal sensation and lustre occurs infiltrations form and ulceration follows The authors examined 200 patients complaining of night blindness Fifty one of these had retinal or optic nerve disease (25.5 per cent) Of 106 night blind patients whose fundi appeared normal 15 gave normal readings on examination with the biophotometer In contrast 40 per cent of controls who made no complaint of night blindness and were free from any sign of diet deficiency showed an impairment of dark adaptation The incidence of night blindness in males was higher than in females this can be explained by the greater liability of the former to be exposed to glare Of 398 persons in whom conjunctival changes were apparent—pigmentation xerosis or Bitot spots either alone or in combination—59.3 per cent were normal as regards dark adaptation but 83.5 per cent of those with night blindness and 84.2 per cent of those with keratomalacia showed one or more of these changes Some loss of sensation and slight loss of corneal lustre though the corneal epithelium was intact [an important point] were the earliest signs noted of involvement of the cornea As the disease advances areas of infiltration or degeneration appear in the deeper layers of the cornea whilst the epithelium remains intact Later the cornea begins to disintegrate rapidly Treatment of slight cases with cod liver oil or shark liver oil by the mouth was satisfactory in the absence of gastro intestinal or liver disorders Shark liver oil was found to contain four times as much vitamin A and twice as much vitamin D as cod liver oil Severe cases were treated by parenteral administration of vitamin A preparations The authors conclude that conjunctival pigmentation either alone or in combination with xerosis or Bitot's spots is not necessarily a sign of vitamin A deficiency

⁴KIRWAN E. O. G. SEN I. & BOSE N. Nutrition and its bearing on Preventable Blindness and Eye Diseases in Bengal *Indian J Med Res* 1943 May v 31 No 1 49-62 [55 refs]

Diabetic Retinitis—Bock⁵ has studied diabetic retinitis seen in Chinese patients. He found that 26 per cent of 183 Chinese diabetics suffered from the disease. Diabetes in the Chinese seems usually to be of a fairly mild type and to be less often complicated by hypertension and arteriosclerosis than in western peoples. Nearly half of those suffering from diabetic retinitis were free from signs of hypertension, retinal arteriosclerosis or renal disease. The age group of diabetics showing the highest incidence of retinitis was that between 50 and 60 and the average duration of the diabetes before the onset of ocular complications was about 25 years. No striking difference as regards hypertension, arteriosclerosis, acetone bodies, cholesterol and renal function was noted between those patients with retinitis and those without, but a higher blood sugar content was observed in the former group. An increased blood sugar content persisting over a long period may damage the capillaries and thus directly cause the ocular trouble. Retinitis is seldom seen in youthful diabetics though their blood sugar content is high. But this may be explained by the fact that young diabetics either succumb to the disease before retinitis can develop or their blood sugar is reduced by insulin treatment. The blood vessels of young persons too are likely to be more resistant to damage than those of older people.

H Kirkpatrick

VENABLES H P & POLLOCK F J Rickettsias in Ophthalmology Arch
Ophthalm 1943 Sept 30 3 36-40 4 figs

MISCELLANEOUS

NEHALL B B G Report on the Physical Development and Health of a Sample of School Children in the Island of Leuan British Guiana 1941 British Guiana Med Ann 1943 95-113

There is a population in the Island of some 3 500 persons the majority of whom are East Indians. This is a preliminary report on the examination for physical defects of 138 of the children. A summary is given of previous inspections of children in British Guiana. In 1917 F G ROSE examined 706 school children in four Georgetown schools. The chief findings, as the extraordinary low standard of nutrition associated with anaemia and a high frequency of infection with intestinal parasites (45 per cent *Enterobius*, *Trichuris* and hookworm 2 per cent). There was very little evidence of malarial infection. Enlarged tonsils and adenoids were rarely found. The condition of the teeth was reported as excellent. A large number of children were infected with scabies and tinea. There was no evidence of pulmonary tuberculosis. In 1920 ROSE inspected 10 006 children between the age of 3 and 16 in the country schools of the East Coast Demerara County. The general findings were similar to those found among the children examined in the Georgetown and sanitary conditions are of very low standard. The schoolmaster rises to near the surface and

⁵Bock R. H. Diabetic Retinitis in Chinese. J Ophthalm 1943 Jun 29 50 6 919-3 [19 refs]

floods are frequent the warm muddy soil being ideal for hatching hookworm eggs. Almost everyone goes barefoot. The main findings of the examination were the following: approximately two thirds of the children had dental caries either of temporary or permanent teeth or of both. SNEATH in 1920 reported dental caries in one quarter of the boys of all races in Queen's College but these boys came from more affluent homes and were better fed than the children in the country schools. Enlarged tonsils and adenoids among Leguan children reach the high figure of 64 per cent whereas Rose found only 2.6 per cent among the children of Demerara County. Variations in standard may account for some of these differences. Every child examined had enlarged glands either cervical axillary or inguinal. Many showed enlargement in two or all three areas. In no case was tuberculosis considered the cause whereas Rose reported tuberculous glands in 21.2 per cent among the boys attending Queen's College. Two only of the Leguan children showed evident signs of filariasis but no blood film examinations were made. Rose reported 52.5 per cent. Four fifths of the Leguan children had anaemia four times the number reported by Dr. Rose. Hookworm malaria and under nourishment probably accounted for most of it. Sixteen per cent of the children under the age of 16 had enlargement of the spleen. Rose found double the number from the country districts of Demerara. The percentage among East Indians was much higher than among blacks though both races were similarly exposed to malaria. Lice were very commonly found among East Indian children but rarely among the blacks. Skin disease including eczema was rarely found. There was no evidence of disease due directly to vitamin deficiency. Defects of vision were very slight. Anthropometric measurements were made but will be presented later the author confining himself to the comment that the physical development of the children is much better than is popularly believed.

Perhaps the chief value of this strictly limited inquiry and the comparison of the findings with those of previous investigators is to show the necessity for a more planned inquiry among both town and country children having special regard to the different conditions which appear to be found even in adjacent geographical areas. If carried out by more than one medical officer closest attention would need to be paid to the question of standards and the extent and degree of defects found. Short of this comparison among different groups of children may be in regard to some findings almost valueless.

Ralph H. Crowley

PAVLOVSKY E. *Parasitological Expeditions in the USSR* *Voks Bulletin* Moscow 1943 No 3-4 29-32 4 figs

The English reader is here provided with an interesting general account of the exploration of the USSR for parasites of man. The paper is authoritative and produced by the man who has directed a very large part of what is here described: organizing and often leading expeditions to remote and very little known areas. The map which accompanies the article shows that expeditions from Moscow have repeatedly gone to the Russian Far East and to the group of republics lying between the Caspian and China. On these expeditions experts of many types: medical men, parasitologists, entomologists and so forth have all had their share recording the distribution of the parasites and studying the biology in the field.

FAWCETT D W & CENS J P Magnesium Poisoning following an Enema of Epsom Salt Solution *J Amer Med Ass* 1943 Dec 18 v 123 No 16 1028-9

Poisoning by magnesium sulphate is of very rare occurrence in 18 cases collected from the literature the illness followed oral administration and no case following rectal injection appears hitherto to have been reported

One of the two cases described in the present paper was in a boy aged 2 years who was given an enema of magnesium sulphate after digital manipulation for faecal impaction he had been operated on two months before for imperforate anus for which a colostomy had been done ten days after birth The enema was returned with good results but almost immediately the child stopped breathing and became unconscious Slight irregular abdominal breathing was resumed after artificial respiration oxygen therapy and an injection of nikethamide but the child died of respiratory failure a few hours afterwards

The other patient was an Italian woman aged 23 years who was admitted with a ureteral calculus She was given prothymine methyl sulphate followed in 15 minutes by a small enema of 4 fluid ounces containing approximately 1½ ounces of glycerine and 1 oz of magnesium sulphate This was retained for two minutes only a considerable amount of fluid being passed two more large fluid motions were passed at intervals of 10 minutes and immediately after the third the patient complained of feeling hot all over and of being very thirsty This was at about 6.30 a.m. and at 7.15 a.m. she became almost unconscious with shallow respiration flaccid limbs and loss of all reflexes including the corneal reflex there was incontinence of faeces but not of urine One gramme of calcium gluconate was given intravenously and this was followed by improvement in the respiration and some movement of the head was observed The calcium injection was repeated 10 minutes later and after another 10 minutes the patient recovered consciousness and asked for water The corneal reflex did not reappear until 2.3 hours later It was found that the stone had been passed and the patient was discharged from hospital three days afterwards Analysis of her blood taken at the time of the first calcium injection (9 a.m.) showed 28.8 mgm of magnesium in 100 cc normal 4 mgm]

The authors think that complaints of feeling hot all over and very thirsty should be taken as premonitory signs of impending poisoning in these rare cases and that it can be prevented by the immediate intravenous injection of calcium

J F Corson

FOX H Yaws Cutaneous Leishmaniasis and Pinta *J Amer Med Ass* 1943 Oct 23 v 123 No 8 459-62

This is a general account of the three diseases in which no new work is reported It has been written as an aid to medical officers who may be called upon to treat native populations but a warning is given that although it is not probable that many American troops will contract yaws and pinta they may acquire cutaneous leishmaniasis

Charles H. Hocks

DORMER B A FRIEDLANDER J & WILES I J A Note on Jigger Flea (*Tunga penetrans*) Infestation in Man South African Med J 1943 Dec 25 v 17 No 24 392 2 figs

The authors state that to judge from the literature no instance of human infestation with *Tunga penetrans* has been reported from South Africa. They encountered a case in southern Natal from which characteristic gravid *T. penetrans* were recovered. A questionnaire to District Surgeons in Natal showed that none had encountered the parasite but enquiries among the natives made it clear that infestation is not uncommon in the coastal areas. Charles Wilcocks

APPELMANS M & GATHY J Keratite par poils de chenille. Porthesia Similis [Keratitis caused by the Hairs of the Caterpillar *Porthesia similis*] Ann Soc Bel et de Méd Trop 1943 Mar 31 v 23 No 1 3-11

In this article from the ophthalmological clinic of the University of Louvain Belgium the authors record in some detail a case of inflammation of the eye due to the poisonous hairs of a caterpillar of the species *Porthesia similis*.

When disturbed the caterpillar secretes an irritant fluid from glands on the dorsum of its posterior segments. The secretion dries on the adjacent hairs and can cause intense itching of the skin and inflammation of the eye. The latter develops in two phases. At first there is a reaction to the irritant secretion with swelling of the eyelids conjunctivitis and superficial keratitis, the cornea showing superficial spots and vesicles. This phase is characterized by pain lachrymation photophobia and diminished vision. The effects gradually subside and the second phase appears as a chronic reaction to the hairs as foreign bodies. They cause little irritation but opaque nodular granulomata are formed which are seen through the microscope to lie in the middle and deeper layers of the cornea.

The case recorded was that of a seven year old girl into whose eye a caterpillar was thrown and caused the signs and symptoms described above. Innumerable caterpillar hairs were imbedded in the parenchyma of the cornea. During the following two weeks the inflammatory condition gradually subsided. After two months the cornea became clearer but oblique illumination showed little spots of infiltration like superficial punctate keratitis. Ulceration had caused shedding off of the superficial hairs but others remained in the deeper layers of the cornea. These spots became more numerous and some peripheral vesicles appeared. Pericorneal injection persisted. The anterior chamber and iris were unaffected.

Four months after the accident the cornea showed very fine opaque stippling in the middle and deeper layers corresponding with the hairs. The pericorneal injection had disappeared. After another six weeks flaky deep opacities were still present but the hairs were fewer and hardly visible. Vision of the eye remained at one half of normal.

J F Corson

ALLISON R S & CRITCHLEY M Observations on Thirst J Roy Nat Med Soc 1943 Oct v 29 No 4 258-66 1 fig

Three healthy sailors were submitted to a test of water deprivation during a period of hot weather [presumably in Britain]. On the first

at a particularly apposite time when the war activity is extending further over tropical and subtropical areas. Many who have previously regarded the human parasitic diseases as remote and intangible entities are now encountering them on a large scale. To these Craig and Faust will afford a valuable source of information. The third edition is slightly larger than the second while the general scope and arrangement are the same. There is some elaboration more especially in the field of epidemiology and therapeutics. There are many new figures in the text, four coloured plates of the malaria parasites have been introduced and two clinical tables with cross references to pages in the text have been inserted at the end of the work. These tables show the salient diagnostic points and the treatment respectively of parasitic and arthropod-conveyed infection of man. The quality of the coloured plates is somewhat disappointing in this clearly printed and well bound volume. Within the limitations of space necessarily imposed by the incorporation of so much matter it is inevitable that statement is at times sweeping. This may lead to erroneous impressions. For example on reading the article on the treatment of malaria one is left to wonder why quinine is used at all when atabrine (mepacrine) appears so superior on every count but that possibly of toxicity. Again from the account of the treatment of amoebic dysentery it appears that the infection is very easily eradicated. Such statements as that chinolone by the mouth is usually curative in asymptomatic carriers and Rarely resistant infections are encountered in which case other drugs may have to be used will not meet with universal acceptance. A serious omission in the articles on the treatment of the leishmaniasis and of the African trypanosomiasis is lack of reference to the diamidine series of drugs which have proved so valuable in the Mediterranean type of kala-azar where the antimonials are frequently ineffective. But these are minor matters in comparison with the successful achievement of the authors' main purpose: to give a concise and lucid account of the parasites which infect man and of the harmful effects of their presence.

A. R. D. Adams

VENDES DE CASTRO B. GIORGI Dante A. KIEFFER Julio C.
Contribuição ao estudo da Pellagra. Contributions to the Study
of Pellagra. 181 pp. With 16 figs. 8 graphs & 30 charts. 1941.
S. Paulo. Bibliography 1.

Presented in book form the first hundred pages are devoted to a consideration of history, geographical distribution, aetiology, symptomatology, etc. then follow 75 pages given up to reports of 30 cases studied in São Paulo Hospital between March 1938 and February 1940.

The volume will doubtless serve the purpose for which it was written and be read in Brazil but it contains nothing new and having been published in 1941 is already somewhat out of date.

Unfortunately too there are many misspellings of names and many omissions geographical distribution for example being most inadequately dealt with.

H. S. Stannus

BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

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SUMMARY OF RECENT ABSTRACTS *

VI PLAGUE

Epidemiology Epidemiology Transmission

MOLL and O LEARY (p 239) give an account of the history of plague in Mexico where the last outbreak ended in 1923. The preventive measures adopted in Mexico are outlined. The same authors (p 389) recount also the history of plague in the West Indies.

In the *Bulletin de l'Institut d'Hygiène du Maroc* (p 604) it is reported that during 1941 there were 1 555 bacteriologically confirmed cases of plague in the region of Agadir. A not uncommon mode of spread is by natives who take goods belonging to a person dead of plague and evading inspection by the authorities introduce the infection into other communities. Plague in Casablanca is connected closely with the grain traffic.

ALONSO MUJICA (p 774) gives an account of plague in Peru and Ecuador where the inhabitants living under primitive conditions carry on a constant traffic in cuis which are highly susceptible to plague. These animals have even been known to cause epizootics in distant places to which they have been consigned. Discussing the capture of rats from the point of view of plague the author enunciates certain rules —(1) Among rats received at the Institute at Guayaquil *Rattus norvegicus* usually predominates to the extent of 75 per cent. When the proportion is equal to that of other species it can be affirmed that the total rat population has decreased a sign of unusual rat mortality. (2) The proportion of female to male rats is usually five to one. If the proportion approaches equality it is a sign of decrease of the total rat population. (3) Freedom of the rats from parasites and other infective diseases is a sign of decrease of the rat population. (4) If plague is found in more than 5 per cent of trapped rats there is reason for alarm and increased efforts of control. Such observations have proved valuable in demonstrating the existence of rat plague and in forecasting outbreaks of the disease.

MACCHIAVELLO (p 909) does not support the current view that the guinea pig and its fleas *Rhopalosyllus cavicola* and *Pulex irritans* play

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 40. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

the most important part in human plague in the Andean region of Ecuador. Domestic rats *R. rattus* and *R. alexandrinus* have been found throughout these areas and *Neotoma* can breed at least sea level up to 9,000 feet above sea level. He holds that rural plague here conforms to the classical rat flea mechanism and that the rôle of the guinea pig is to act as a reinforcing factor because it is a collector with man acts as a flea trap and is extremely susceptible to plague.

Plague last broke out in Venezuela in 1939-40 when a sparsely populated area was affected. The rats of this region are mainly field rats and the outbreak must be regarded as sylvatic. HECHT (p. 605) found most of the fleas from rodents to be of the genus *Protophyllis* but in the city of Caracas where the rats are chiefly *R. norvegicus* 9 per cent of the fleas were *Xenopsylla cheopis*.

ALBERTO ALVARADO (p. 773) reports the recent epizootic of plague in wild rodents which occurred in northern Argentina and which led to a severe outbreak in man during 1940. Control measures were instituted and the incidence of human disease declined very greatly during 1941.

In the *Bulletin Sanitar* (p. 114) an account of an investigation into plague in the neighborhood of Quequen, Argentina. The disease was probably introduced by the grain traffic and its introduction coincided with the height of the epizootic in rats. There is evidence of the very close association which exists between rat and the sylvatic rodents. For instance the rat flea *Xenopsylla fasciatus* was found on culs and the culs themselves were caught in the grain stores of the port.

FINN ET AL. (p. 646) discuss sylvatic plague in ground squirrels of Kern County, California where although intervening surveys were negative plague was proved in 1934 and 1941. An inapparent infection (possibly a true latent infection) was demonstrated in young squirrel in October 1941. It was in the burrows have been known to survive 63 days after experimental infection and may provide at least a temporary shelter for the bacilli when the rodent host population is low. Plague infection was demonstrated in *Dipodomys montanus*, *Hoplosyllis a. omalius* and *Echidnophaga gallinacea*.

FRANCE (p. 775) states that plague has been demonstrated in wild rodents of the Western United States. City rats will migrate as much as four miles and contact between urban rats and sylvatic rodents is possible. Fleas of the latter are now finding their way to rats near the centres of population of coastal towns. In San Francisco infected *R. norvegicus* were found in 1941 for the first time since 1908 and if the infection should spread from wild rodents to urban rats there is the risk of serious outbreaks in man. On the three common rats *R. norvegicus*, *R. rattus* and *R. alexandrinus* there were found 21 species of fleas, the commonest in coastal cities being *Neotoma*, *Xenopsylla fasciatus* and *Leptopsylla segnis*. Nine of the species have been proved capable of transmitting plague under experimental conditions but transmission tests with *Leptopsylla* were not successful.

SCHWARZ (p. 740) contributes notes on commensal rats pointing out that the rat usually referred to as *R. rattus alexandrinus* is in fact *Protophyllis*. He describes the distinguishing features between these rats both of which are found in the United States. The latter tends to nest in trees and control measure effective against *R. norvegicus*, *R. rattus* and *R. alexandrinus* may therefore be

ineffective against *R. r. frugivorus*. Notes are also given of the spread of rats into East Africa.

STEWART (p. 841) sums up present knowledge of the status of vectors of sylvatic plague in N. America naming one of the fleas most widely distributed on the wild rodents and referring to those fleas which may play a part in transmitting the disease from these rodents to domestic rats. The part played by fleas in transmitting plague from wild rodents to man is not understood and in a number of cases human infection has been traced to bites by captive wild rodents.

EWING and FOX (p. 841) have issued a classification of the fleas of N. America with keys to families, subfamilies and genera but not to species. They note that for many years *X. cheopis* appeared to be confined to large ports but that since 1925 this flea has been found in a number of inland areas as far north as Iowa and Minnesota.

DOUGLAS and WHEELER (p. 695) have carried out detailed work on the infection of *Xenopsylla cheopis* and *Diplospilus montanus* with *Pasteurella pestis* and emphasize that the transmission of plague by fleas is absolutely dependent on the multiplication of the organism in the alimentary tract. The faeces of the fleas are probably not important in infection of the mammalian host. In comparing the vector capacity of the two fleas the authors note that many factors are involved.

GIRARD (p. 842) refers to the flea *Synopsyllus fonquerni* which is found abundantly on insectivorous hedgehogs in Madagascar and which has been found on *R. r. alexandrinus*. It is capable experimentally of becoming infected and of transmitting plague to guinea-pigs but it is not known whether it bites man or is liable to become blocked like the known vector fleas.

Aetiology

BERMAN (p. 538) defines the criteria of classification of the genus *Pasteurella* and has investigated the growth requirements of the various species included in this genus. *P. pestis* and *P. pseudotuberculosis* are comparatively easily grown: they develop well in a medium of amino-acids, inorganic salts and glucose and do not require the accessory growth factors (including various vitamins) necessary for some other species.

DOUDOROFF (p. 775) reports studies on the nutrition and metabolism of *P. pestis*. The original abstract should be consulted for details but one finding was that very heavy growths could be obtained in synthetic media with glucose and small amounts of cystine and phenylalanine if adequate aeration was provided by constant agitation.

DEVIGNAT (p. 390) describes a method (not new) for the oxygenation of fluid culture media by means of which greatly increased growth of bacteria (including *P. pestis*) may be obtained. With SCHOETTER (p. 391) he has shown that two highly virulent strains lost their virulence after 30-36 days of cultivation under continuous oxygenation. These strains preserved a high degree of antigenic power and one was comparable in protective power for the guinea-pig with the well known E.V. strain.

MACCHIAVELLO and PARACAMPOS (p. 48) have studied the effect of climatic conditions on the viability of *P. pestis* in pathological specimens. Heat, desiccation, putrefaction and variations of humidity

are a true reflection of the active results in cultivation from such material. The best practical method of despatch in the tropics is in the form of a culture in which a large piece of the tissue is left in the nutrient. The method of LONG (embedding the tissue in paraffin) implies a delicate and suspension of the material in glycerine has been used. Cultures on agar or sulphite agar have also been made for transport to the laboratory.

The authors (p. 49) have found that *P. pestis* remains viable longer in the spleen than in liver tissue when kept in the icebox. Virulence is progressively lost however and although this could often be restored in Chilean strains the change appeared to be irreversible in the Brazilian strains. On the whole refrigeration of organs is not recommended as a routine method of preserving the plague bacillus nor is the procedure of keeping the viscera in glycerine (50 per cent) at low temperatures.

The authors show that living bacilli could still be recovered from cultures on solid media after being kept for 284 days at laboratory temperature even when the media were apparently quite dry. The addition of blood to the media notably protected viability and virulence. In fluid cultures the concentration of toxic substance, metabolic or mineral influenced viability. The authors conclude that it is preferable to send material for diagnosis in the form of cultures instead of in the form of tissues or viscera.

If stab cultures of *P. pestis* are covered with 1-2 cc. of paraffin oil the viability of the organisms is greatly increased (for several years) whether the cultures are kept at room temperature or under optimum conditions. Virulence under these conditions is diminished more than in cultures preserved in the icebox.

MACCHIAVELLO (p. 46) has shown that strains of *Pasteurella pestis* isolated from man, rat and flea in Brazil do not differ from each other or from strains from other parts of the world. Strains recovered from cold morbillal buboe (*in a de friso*) from which isolation is usually difficult do not possess characteristics which would justify their being regarded as a special race. This condition is regarded as an attenuated form of bubonic plague.

MACCHIAVELLO (p. 47) has made a study of colony variation, toxicity and biochemical reactions of *P. pestis* recovered from the various types of plague in man, rodents and flea. Morphological variations in colonies are not always accompanied by changes in biochemical properties and effectiveness of dissociation is not to be judged from the superficial smooth or wrinkled aspect of a culture. It is the granular or homogeneous internal structure of a colony, not its surface appearance which is important as an index of virulence. Homogeneous colonies, finely granular and also virulent are unstable; the coarsely granular and avirulent are stable. The smooth antigen is an antigen of the deep structure and does not influence the colony morphology.

MACCHIAVELLO (p. 48) describes two strains, one from a human gland and one from a rat which he regards as true stable mutations from the normal type. The evidence on which this opinion is based includes morphological, biochemical and serological tests.

POWERS (p. 776) note that a coccobacillus resembling *P. pestis* has been isolated from an apparently healthy rat. This was identified as a species previously isolated from rodents with pseudo-tuberculosis. It might lead to error in the diagnosis of rodent plague.

Pathology Clinical Findings Treatment

HENNESSEY (p 240) points out that pathologists who rely on the classical appearances of bronchopneumonia in making a diagnosis of plague pneumonia may fall into error. He states that in 38 autopsies on patients dying of primary plague pneumonia the condition was true lobar pneumonia. Fulminating plague usually kills the patient before the stage of red hepatization has been passed the occurrence of advanced lesions of the lobar type is an indication that the strains of *P. pestis* in this part of Kenya are of reduced virulence.

JUNIOR (p 50) uses for diagnosis an intradermal test for which the antigen is prepared from a guinea pig primary bubo boiled in saline ground in saline in the proportion 1 gm to 20 cc and filtered through gauze. Phenol (0.5 per cent) is added and the dose is 0.1 cc.

POLLITZER and LI (p 776) recount an investigation of an outbreak of primary pneumonic plague in which they noticed that as the disease spread the symptoms changed and that the number of patients with bloody frothy sputum decreased. This type of sputum is the chief vehicle of spread and they found that infection never resulted from contact with a patient who had neither bloody sputum nor cough.

CLARK and GOLDBERG (p 605) report an outbreak of 11 cases of pneumonic plague in South Africa. One of the patients recovered. This woman had been given an injection of live avirulent vaccine and of anti plague serum five days before her illness developed because she was a contact of another case. She was treated with large doses of serum to a total of 400-500 cc. Control measures in this outbreak included the use of avirulent live vaccine and serum. The vaccine gave little trouble.

SAVINO and VILLAZON (p 306) have tested sulphanilamide sulphapyridine and sulphathiazole in experimental plague in guinea pigs. The drugs were used in suspensions of 30 per cent in 20 per cent gum arabic. Only sulphanilamide was given orally and it was ineffective. Both sulphapyridine and sulphathiazole were superior to sulphanilamide in protective power. The latter in doses of 0.5 and 1.5 gm did not protect against one minimum lethal dose whereas the two former drugs protected against 10 000 minimum lethal doses. Some animals previously treated and then inoculated with *P. pestis* developed bubonic or latent infection. BURGA SAAVEDRA (p 306) reports two cases of bubonic plague successfully treated with sulphathiazole. One also received an injection of serum.

Remarks on the low incidence of plague in Argentina during 1941. COSSIO (p 773) notes that the case mortality rate was also low (60 per cent as against the usual 90 per cent). This is attributed to the use of sulphonamides in treatment but unfortunately no details of the drugs are given.

In a note on an outbreak of 10 cases of plague in Haifa (p 538) it is stated that the patients were treated with sulphapyridine. There were no deaths. Vaccination was reserved for contacts. The outbreak in man was preceded by infection in rats and an infected rodent was found in routine examination of the port area two months before the first human case occurred. Measures against rats included trapping and demolition of rat harbours.

Vaccines Control

GIRARD and ROBIC (p 777) have brought their observations on plague in Madagascar up to 1941 and refer especially

decline in incidence which has coincided with the use of the live attenuated EV vaccine since 1933-34. During this time there has been no change in the flora fauna of rats.

VINCENT and JANSSENS (p. 391) have tested the efficacy of vaccination with the live EV vaccine (which had been maintained in the Belgian Congo for 1 year) as a protection against three virulent strains of *P. pestis* isolated locally. With vaccine doses of 2 000 million to 1 000 of immununity against standard lethal doses was conferred in 57 per cent of the series of guinea pigs whereas with Haffkine's vaccine the figure was only 12.5 per cent. The advantage of live vaccine appears to justify its use and since this experimental work was done thousands of vaccinations have been performed by the authors in the field without difficulty or inconvenience.

STEVART (p. 506) has found that carbon disulphide is highly efficient in killing rodents (such as the ground squirrel) in their burrows and is less toxic to man and cheaper than methyl bromide though it has the disadvantage of being explosive. Carbon disulphide cannot however be relied upon to kill fleas except in concentration which render it more expensive to use than methyl bromide which is a more efficient killing agent.

SHERPARD (p. 847) has elaborated a plan for rodent control in cities which includes a course of training for the staff. Control procedures should be permanent and comprise rat proofing, elimination of accumulations of waste material, proper storage of goods, trapping, fumigation and poisoning.

Charles Walcocks

MALARIA

SHUTE P. G. Indigenous Malaria and Mosquito Control in England after the War. *J. Roy. San. Inst.* 1944 Apr. v. 64 No. 2 85-93 5 figs.

The author recalls the return to England of large numbers of men infected with malaria during and after the war of 1914-18 and the more than 600 cases of malaria contracted in England to which they gave rise. All but one were *P. vivax* infections. Such an experience is likely to be repeated. Of the four species of *Anopheles* that occur in England *A. at. cruentus*, *A. cl. s.*, *A. plumbeus*, *A. maculipennis* only the last is likely to be of any importance as a vector. Two races of *A. maculipennis* occur *messeae* and *atroparius*. *A. m. messeae* prefers domestic animals to man. *A. m. atroparius* is apparently the only efficient vector. It breeds in brackish water—a fact that may explain why 90 per cent of the indigenous infections occurred near the coast, notably in Essex and Kent where *A. m. atroparius* appears to be much more numerous than elsewhere. The transmission season is short, June to September. The most efficient measures of control are likely to be the thorough treatment of malaria patients, spray killing adult *Anopheles* in and near infected premises and anti-larval measures where circumstances permit.

Norman White

BRITISH GUIANA MED J. 1943 161-8 Report on the Activities of the Malaria Investigations Service of the Medical Department British Guiana for the Year 1942

The Malaria Investigations Service organized in 1939 to investigate the malaria problems of British Guiana is supported by the Government the Sugar Producers Association and the Rockefeller Foundation

Over 90 per cent of the population of the Colony live in a coastal belt 5 to 15 miles wide much of which is below high tide level The work of the Service to date had been largely concerned with the study of the habits of coastal anopheline The species are 1 *darlingi* *A albitarsis* *A triannulatus* and *A tarsimaculatus* 1 *tarsimaculatus* probably includes *A aquasalis* and *A osualdoi* and possibly others *A darlingi* is the chief vector

British Guiana experienced a drought of 33 months from September 1938 to June 1941 the effects of which were noticeable till the end of 1942 Anophelines became scarce *A darlingi* disappeared about April 1940 It reappeared in June 1941 but for a time its distribution was very limited and it only spread rapidly toward the close of 1942 The drought did not dry up breeding places there was at all times an abundance of water much of which appeared to be favourable to mosquito breeding but there were chemical and perhaps biological changes in many waters The malaria incidence was lessened but increased again in 1942

Of 11 687 adult anophelines identified in 1942 90.8 per cent were *A darlingi* 7.7 per cent *A tarsimaculatus* 1 per cent *A albitarsis* and 0.5 per cent *A triannulatus*

Of 6 849 larvae identified 73.4 per cent were *A tarsimaculatus* and only 6.1 per cent *A darlingi* Larvae of *A darlingi* are apt to be scattered widely and are rarely abundant in any single breeding place the adults frequent dwelling houses and remain there many hours after taking a blood meal

Of 917 adult female *A darlingi* dissected 10 had sporocysts on the stomach and 8 had sporozoites in the salivary glands No infection was found in 41 *A tarsimaculatus* and 2 *A albitarsis* dissected *A albitarsis* is an important vector in Brazil but in British Guiana it rarely enters houses There was some evidence that *A tarsimaculatus* was responsible for malaria transmission in Georgetown and elsewhere but *A darlingi* is by far the most important vector

The spray killing of adult anophelines is to be tried as a measure of malaria control it should be of great value against a house haunting species such as *A darlingi* The application of drainage methods of malaria control has very limited possibilities in the colony

No anophelines breed in the bromeliads of British Guiana

Norman White

SCHWETZ J Considerations sur les varietes morphologiques des trophozoites de *Plasmodium falciparum* signalees en Afrique intertropicale [Morphological Varieties of Trophozoites of *P falciparum*] Ann Soc Belge de Méd Trop 1943 Mar 31 v 23 No 1 47-62

The author discusses the variations which have been described in the form of parasite in benign tertian and malignant malarial infections

JONES J W Jr Observations and Suggestions concerning some Factors related to Malaria Mosquito Surveys *J Tennessee Acad Sci* 1943 v 18 No 4 298-304 1 graph [Summary taken from *P Applied Entom Ser B* 1944 Mar v 32 Pt 3 60]

It is the practice in the Mississippi valley to estimate the rate of production of *Anopheles quadrimaculatus* Say from breeding places and the consequent need for measures against the larvae from the numbers of adults found in neighbouring buildings that provide shelter for them during the day. The author has found however that some of the collecting stations chosen do not provide comparable data because they are inspected without regard to physical variables. This is particularly true of buildings with metal roofs as they provide shelter early in the morning but become so hot and dry as the day advances that the mosquitoes are forced to leave them. He has also found that the mosquitoes may remain in a particularly favourable shelter for so long a time that their abundance may not indicate very recent production from a breeding place. In one instance a swamp was treated when the number of mosquitoes in a neighbouring collecting station rose to 3 000. Dipping records indicated that the treatment had reduced the numbers of larvae by 97 per cent but it was continued for a further two weeks as there was no reduction in the numbers of mosquitoes in the station. It might have been continued indefinitely had not the resident mosquito population of the station been eliminated by spraying when the daily counts had shown the presence of over 3 000 for 24 consecutive days. The counts after spraying varied from 0 to 46 for 11 days and showed no appreciable rise for several weeks.

Another station in which the mosquito population had been over 300 for over a month contained 482 females of *A. quadrimaculatus* on 5th July. On that day 478 were caught and stained and 400 of these were returned to the shelter. A sample of 200 mosquitoes was caught in it on 23rd July and 124 of them showed the stain indicating that 62 per cent of the population had been in it for 18 days. Another stained individual was recovered on 9th August which showed that a female can survive for at least 35 days in nature. In view of these observations the author suggests that the proper method to adopt in the use of counting stations is to destroy all mosquitoes by spraying after each count is made.

On the basis of observations at a reservoir in Mississippi the author also draws attention to the effect of water fluctuation on the breeding of *Anopheles quadrimaculatus*. A rise of three inches converts a large area of grassland into a marsh favourable for breeding but a further rise covers the grass so that this area is subject to wave action while it produces another favourable marsh at a higher level. A reverse sequence results as the water falls and in general a given area remains favourable for not longer than the time required for the development of a single brood.

HIXON H Data and Observations on the Natural Reduction of *Anopheles* Mosquito Larvae in certain Environments *Florida Entomologist* 1943 v 26 No 2 17-24 [Summary taken from *R Applied Entom Ser B* 1944 Mar v 32 Pt 3 60-61]

The studies described were carried out in 1938-39 in a small lake and a shaded permanent pond in Florida the flora and fauna of which

are described *Anopheles quadrimaculatus* Say and *A. crucians* Wied were present in both collections from the pond in May 1939 when the temperature of the water was 25-26 C [77-78 F] and mosquitos and predators were scarce. The numbers of mosquito larvae in the first second third and fourth instars and of pupae were 12 17 24 31 and 8 the differences corresponding to the times required to complete the successive stages. Collections in August when the temperature of the water was 25-27.5 C [77-81.5 F] and Anopheline larvae were numerous showed a decrease of 81 per cent between the first and fourth instars. This is attributed to the effectiveness of abundant larvae of Hydrophilid beetles (*Tropisternus* spp.) in the absence of minnows. The biotic potential of the Anophelines was however high enough to ensure that a considerable number of mosquitos reached the pupal stage. The fauna in the lake included minnows (*Gambusia affinis* and *Heterandria formosa*) in abundance and larvae of *Tropisternus* and other predators in comparatively small numbers. In December 1938 and January 1939 when the water temperature was 17-18 C [62.6-64.4 F] a decrease of only 19 per cent occurred between the first and fourth instars and many individuals completed development. In the middle of April when the minnow population had increased considerably and the water temperature was 28-29 C [82.4-84.2 F] a decline of at least 40 per cent between the first and fourth instars was indicated but the pupal incidence showed that a considerable number of mosquitos could still complete development. By May when the minnow population had reached its height and water temperature was 24-34 C [75.2-93.2 F] there was a reduction of about 87 per cent during larval development and the numbers reaching the adult stage were insignificant. From the middle of June to the end of August very few Anopheline larvae were found probably on account of the high water temperatures which ranged up to 38 C [100.4 F].

This study indicates that *G. affinis* is a dominating species. Its effectiveness increased with the size of the mosquito larvae but depended in the presence of protective vegetation on the activity of other aquatic life. The efficiency of *Tropisternus* is not affected by the size of its prey and depends on the Anophelines habit of remaining immobile in contact with vegetation or other floating matter.

DHAYAGUDE R. G. & PURANDARE N. M. Autopsy Study of Cerebral Malaria with special reference to Malarial Granuloma. *Arch Pathology* 1943 Dec. v 36 No 6 550-58 2 figs

At the King Edward VII Memorial Hospital Bombay autopsies were performed on 97 patients with malaria in the course of 15 years. Of these malaria parasites were found in the capillaries of the brain in 55 and these form the subject of this study. All ages from 5 to 60 years were represented but the commonest group was that aged 21-40 males predominated. The main clinical manifestations were fever and coma often with signs suggesting meningitis. In seven cases there was no fever but these patients were collapsed on admission and died shortly afterwards. In many cases parasites were not found in the peripheral blood. Clinical diagnoses recorded in 18 patients included tuberculous or other meningitis pneumonia gastro enteritis typhoid or dysentery septicaemia and uraemia.

July 1944

Tropical Diseases Bulletin

The parasitological findings if available should be noted before the
 symptomatic characteristics C. H. Hoare

MOIT H. A. MELENEY H. E. Falciparum Malaria The Importance of
 Early Diagnosis and Adequate Treatment J. Amer. Med. Ass.
 1944 Jan 8 124 No 2 71-6

A large number of American civilians who have been working in
 tropical countries where *P. falciparum* malaria is endemic return to
 America and some fall ill with malaria after their return. Doctors
 who are unfamiliar with the varied clinical picture which *falciparum*
 malaria may assume fail to recognize the nature of the illness. Specific
 treatment is delayed sometimes with fatal results. Such difficulties in
 prompted this paper. Eight cases illustrative of the difficulties in
 diagnosis that may arise are described. Clinically malaria should be
 suspected in every patient who has recently returned from the tropics
 having the symptoms. Fever may be absent even in a overwhelming
 infection. It is impossible to present a clinical description of malaria
 that will cover all its manifestations. Every passenger and crew
 member of an airplane returning from a malarious region should be
 instructed to obtain medical attention on the first development of any
 symptom of illness even those of a common cold and be informed that
 he should have his blood examined for malaria by a physician if he
 falls sick. Thick and thin blood smears should be examined. If the
 first results be negative blood examinations should be repeated every
 12 to 24 hours until malaria is confirmed or excluded. In suspected
 cases specific treatment should not be delayed pending microscopic
 confirmation of diagnosis. The symptom of onset are most frequently
 mistaken for infections of the upper respiratory tract or for various
 gastro-intestinal disorders.

For the treatment of uncomplicated cases atabrine by mouth is
 recommended. If there be high parasite density or evidence of visceral
 localization atabrine should be given intramuscularly or quinine
 intravenously. This should be continued till improvement is apparent.
 Exchange to treatment by mouth. In cerebral cases quinine dihydro-
 chloride with dextrose solution and isotonic saline should be given
 intravenously every four hours. Nicotinic acid intravenously is also
 recommended in these cases to produce dilatation of cerebral capillaries
 and thus improve consciousness. The
 spinal drainage may be useful in restoring consciousness. The
 Surgeon General Circular Letter on the treatment of malaria is
 referred to with approbation in Bulletin 1944 41 96-7
 Norman Whit

STIRK E. V. Pulmonary Signs in Malaria J. Roy. Soc. Med. Ser.
 1943 Oct 29 No 4 2-4

The author writes of his experience when working in R.A.S.Q.
 in an area in which malaria sandfly fever and respiratory infections
 are alike common. He gives clinical notes of four cases of benign
 tertian and one of mixed benign tertian and subtertian malaria in which
 there were signs of bronchitis or incipient pneumonia. About ten per
 cent of malaria cases in the area present some sign of lung involvement.
 It is thought that high atmospheric temperatures in the hot months
 (maximum temperatures from 106 to 110 F minimum 73 S to 82 F)
 and the debilitating effect of previous attack of malaria and sandfly
 fever may contribute to the high incidence of chest complications.

Similar manifestations have been noted in cases of sandfly fever in the late summer and early autumn. It is noted that sulphapyridine and quinine have been given concurrently in several cases without ill effect.

Norman White

RAVEN R W The Surgical Aspects of Malaria *J Roy Army Med Corps* 1944 Feb v 82 No 2 92-6

This is a study of malaria from the point of view of an officer in charge of a surgical division of a military hospital in North Africa. Bodily injury may precipitate an attack of malaria in persons who apparently enjoy good health at the time of injury in spite of their having taken antimalaria drugs regularly. Illustrative examples are given. Patients in hospital on account of fractures, bruises, burns and gunshot wounds developed malaria during their stay. Other patients developed clinical malaria as a result of operation. Malaria may lessen resistance to infection and retard the healing process. [It may also be a cause of failure in skin grafting see this *Bulletin* 1942 v 39 517]

A short description is given of the abdominal symptoms which may be caused by malaria infection and simulate conditions calling for surgical interference. [These have been frequently described.] The existence of malaria does not of course exclude the possibility of there being also an acute intraperitoneal lesion. The author has operated upon two patients who had both malaria and appendicitis; the appendix was gangrenous in one case. A description is given of a case of spontaneous rupture of the spleen in malaria.

Norman White

NELSON JONES A Malignant Malaria on the Gold Coast some Clinical Notes *Ann Trop Med & Parasit* 1944 Apr 19 v 38 No 1 1-20 16 charts

This description of malignant tertian malaria on the Gold Coast is based on 2000 cases seen in one year among members of the white Service personnel between 19 and 45 years of age. As in nearly all descriptions of this form of malaria emphasis is laid on the protean nature of the symptoms to which infection with *Plasmodium falciparum* may give rise. The cases described are illustrative of this. Full differential diagnosis involves almost the whole of medicine. A negative blood film does not exclude malaria even in severe cases. A patient should never be allowed to die of untreated malaria because the disease appeared in an atypical form and no parasites were discovered on blood examination. Aids to diagnosis in these difficult cases are well described. Sternal puncture is useful but is too painful to be popular.

The first principle of treatment is to establish ascendancy over the infection as rapidly as possible with quinine or mepacrine. The author decries the tendency to restrict treatment to the short courses advocated by the Malaria Commission of the League of Nations. He believes this to be the cause of much chronic ill health on the West Coast of Africa at the present time. It was common to find men who had had a short course of treatment complain several days or weeks after its completion that they had had headaches and slight shivering attacks or sweating. A study of the case records of R A F personnel enabled an appraisal to be made of the relative efficacy of the three main

treatments of the average case which the men had received at other hospital. These were (1) Quinine 30 grains a day for seven days followed by plasmoquine [pamaquin] 0.03 gm a day for three days (2) Quinine 30 grains a day for two days then quinacrine [mepacrine] 0.3 gm daily for five days then after an interval of a few days plasmoquine 0.03 gm daily for three days (3) Quinine 30 grains daily for seven days followed by quinine 20 grains daily for another seven days. The third treatment was by far the best. Men had more fully regained their vigour and far less often developed progressive ill health.

Plasmoquine may reduce the relapse rate of *P. vivax* and *P. malariae* infections but there is no evidence that it does so to any great extent in *P. falciparum* infections on the Gold Coast. To destroy gametocytes in the blood of Europeans when the surrounding African population is so rich a reservoir of infection is insufficient justification for giving a toxic drug to Europeans as a routine measure. The author would like to see the practice discontinued and further research made for a really effective anti-relapse drug.

Rest in bed is desirable for a week in every case and no man should return to work until he feels and looks well after being up and about all day. As a rule air pilots should not fly within three weeks of the commencement of treatment.

The only fatalities in the series reported were in two cases of black water fever and one of cerebral malaria. Norman White

GILLET J. A. Treatment of Cerebral Malaria [Correspondence]
Brit Med J 1944 Apr 8 505-6

This is a short note describing what appears to be a useful procedure. Four cases of cerebral malaria, all of violent manic type were treated each by one intravenous injection of sodium pentothal in the same doses as are used for surgical purpose. The effect was to induce deep comfortable sleep lasting several hours. When the patient passed under the influence of the pentothal sodium intravenous quinine (10 grams) and subcutaneous adrenaline (10 minims) were given.

Three of the patients appeared to be perfectly normal on awaking the fourth was comatose for several days. Quinine and mepacrine were given and all recovered. It is surmised that the fall in blood pressure brought about by the pentothal was accompanied by some dilatation of the cerebral vessels and that this and the action of adrenaline enabled the quinine to act more quickly on the parasites. However this may be the pentothal was much more effective than morphine or chloroform in controlling the violence of the patients.

The infections were due to *Plasmodium falciparum* in British Honduras. Charles Wilcocks

WAR OFFICE Notes on the Treatment of Malaria occurring in Individuals returning from Service in Malarious Areas 5 pp 1944
Feb 29 London H.M. Stationery Office [1d]

These notes replace those issued in 1941 [this *Bulletin* 1942 v 39 21]. The recommendations are much the same as before the principal change being in the treatment advocated if mepacrine is not available. The relevant paragraph now reads as follows—
Give 10 grains of quinine in solution by mouth three times a day after food for 7 days combined with 0.01 gramme of pamaquin three times a day during the last 3 days of this treatment.

To conserve the supply of quinine it is however important that the combined quinine mepacrine pamaquin course as laid down in Section III should whenever possible be employed

In the original notes pamaquin was not advocated for use concurrently with quinine

Charles Wilcocks

McGUIRE C Quinine [Indian Tea Association Calcutta Mimeographed Circular 4 pp Recd at Bureau March 24 1944]

This circular describes the difficulties that have arisen in tea garden medical practice in hyperendemic malaria areas owing to the existing short supplies of quinine and how those difficulties have been very successfully overcome Euquinine which was relied on for the treatment of infants and quinine bihydrochloride for intramuscular injections have been almost unobtainable The brand of quinine sulphate now being issued by the Government of Bengal is inferior in appearance though apparently not in other properties to the brand issued in former times

The adult members of the labour population have for the most part been long resident in the locality and have acquired a very high degree of immunity against malaria On them the shortage of quinine has inflicted little hardship Of 262 cases of malaria among them in which no quinine or other specific remedy was given the fever lasted less than 48 hours in 216 and 206 of the patients (78.6 per cent) remained free from further fever attacks for a period of 30 days Of 233 other patients suffering from malaria who each received but 10 grains of quinine only 18 per cent suffered from further febrile attacks during the subsequent 30 days These results were but little less favourable than those obtained by more intense quinine therapy

The treatment of infants and young children prior to the acquisition of immunity of non immunes and of pregnant women suffering from malaria is always a matter of urgency The author has found that quinine sulphate can safely replace quinine bihydrochloride for intramuscular injections which is the routine method of treating infants now that euquinine is unobtainable The method of preparation is as follows 100 grams of quinine sulphate are dissolved in 10 cc of distilled water to which 100 minims of dilute hydrochloric acid (B.P.) have been added Further distilled water is added to bring the total quantity up to 20 cc The solution is filtered through moistened filter paper boiled and kept in a sterile rubber capped or stoppered bottle The solution may be reboiled if necessary One cc of the solution contains 5 grains of the sulphate With the new Government brand of quinine the solution is slightly discoloured Intramuscular injections with this solution are just as effective as bihydrochloride injections and are no more prone to produce abscess formation

[The author makes no mention of the use of mepacrine or other synthetic antimalaria drug]

Norman White

PARROT L CATANEI A COLLIGNON E & AMBIALET R Nouveaux essais de prophylaxie collective du paludisme par les médicaments synthétiques [New Trial of Synthetic Drugs for Collective Prophylaxis of Malaria] *Arch Inst Pasteur d'Algérie* 1943 Sept v 21 No 3 131-79 21 diagrams [Refs in footnotes]

The first comparative study of the relative value of quinacrine [mepacrine] and quinine in the mass prophylaxis of malaria was

undertaken in Algeria in 1935-36 on behalf of the Malaria Commission of the League of Nations. The results showed that quinacrine 0.05 gm daily was insufficient [this *Bulletin* 1938 v. 3: 422-4]. In 1939 the studies were resumed under the general direction of Ed. Serpent and the results of these further observations are now recorded. In 1939 0.30 gm of quinacrine was given to every adult once a week. In 1940 and 1941 0.20 gm of quinacrine was given twice a week and the results compared with those obtained by the daily administration of quinine to comparable populations. Children received proportionally smaller doses. The drugs were given throughout the transmission season to every individual in the experimental areas. The drugs were taken in the presence of visiting nurses in the people's own homes. Spleen measurements were made at the beginning and end of each season's campaign. Blood examinations were made every 15 days from the beginning to the end of the transmission season and once or twice after the cessation of drug administration. Individual cards were kept. Stress is laid on the importance of repeated blood examinations in studies of this kind to determine the nature of infections and parasite density. Of chief significance are monthly variations in plasmodiometric indices especially in children in the 0 to 15 age group [for explanation of plasmodiometric index see this *Bulletin* 1943 v. 40: 739].

The 1939 observations were carried out on a community of agricultural workers and their families numbering in all 389 persons living in a very unhealthy part of the Department of Constantine close to the wadi Rmel where malaria is hyperendemic. The numerous canals and irrigation channels are prolific in the production of *A. maculipes* *labranchiae*. Quinacrine was administered from the 1st of June to the 31st of October. It was a severe epidemic year and the dose administered 0.30 gm once a week for ages 10 years and over 0.10 and upwards for lower ages was insufficient to prevent an epidemic of *P. falciparum* malaria and to a less degree of *P. vivax* malaria among the protected population while the medication was still in progress. A markedly reinforced reservoir of infection remained after the termination of the experiment.

For the 1940 and 1941 observations a very unhealthy marshy locality at the mouth of the wadi Regha was chosen. Breeding of *A. maculipes* *labranchiae* was intense. Communities on either side of the river were of approximately equal size but there were great economic and social differences between the two. The natives on the left bank (403 persons) were a settled community of land owners and their families living in fairly well constructed houses and reasonably prosperous. On the right bank the community of 457 persons consisted for the most part of casual daily workers and their families living in huts. Their earnings were small and they sometimes sought work far afield. In the 1940 campaign dwellers on the left bank received quinacrine those on the right bank quinine. In the 1941 campaign the right bank formed the quinacrine group and the left quinine. Quinacrine was given in doses of 0.20 gm twice a week at two or three days interval to all over the age of 8. Lower ages received from 0.05 to 0.15 gm. Quinine 0.40 gm was given daily except Sundays to all over the age of 10. Lower ages received from 0.10 to 0.20 gm daily. The period of administration was from May 1st to November 30th. Favourable and approximately equal results were obtained with quinine and quinacrine thus administered. Both drugs diminished the reservoirs of infection more especially of *P. vivax* and of *P. malariae* quinacrine

was superior in this respect. Neither drug completely suppressed the epidemic of *P. falciparum* malaria.

In all the experiments quinacrine was well tolerated inasmuch as there were no toxic accidents. From 9 to 17 per cent of persons receiving quinacrine twice a week developed some yellow discolouration of the skin which caused a certain number of women to refuse to continue the treatment. The administration of quinacrine to small infants by spoon frequently provokes immediate vomiting. This is a serious obstacle to drug prophylaxis in this earliest age group.

The conclusions are reached that quinacrine can replace quinine in mass prophylaxis among the natives of Algeria given a conscientious and disciplined staff for distribution and adequate medical supervision that neither quinacrine nor quinine can give more than partial and quite temporary protection and that drug prophylaxis cannot replace other measures of defence against malaria notably antimosquito measures wherever such are practicable.

Norman White

1. RAEVSKY G E [Experiment on Malaria Zooprophylaxis in the Village Shitkhala Kabardino Balkarian ASSR (1938-40)] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 4 11-21 [In Russian]
- ii. SHEINKER K P [The Effectiveness of Zooprophylaxis in a Village with High Malaria Incidence] *Ibid* 22-8 1 chart [In Russian]
- iii. PLATONOV N V & TARABUKHIN I A [Experiment on Malaria Zooprophylaxis in Western Siberia] *Ibid* 29-38 [In Russian]
- iv. ZAVOISKAYA V K [Experiment on Malaria Zooprophylaxis in Villages on the Kutuluk Barrage Lake] *Ibid* 38-46 4 figs [In Russian]
- v. RAEVSKY G E [The Influence of certain Factors on the Effectiveness of Malaria Zooprophylaxis] *Ibid* 52-7 [In Russian]
- vi. RAKHMANOVA P I [Evaluation of the Suitability of different Types of Animal Houses and of various Domestic Animals as a Zooprophylactic Barrier against *A. maculipennis*] *Ibid* 57-60 [In Russian]
- vii. POLUMORDVINOV A D [The Attraction of various Animals for *A. maculipennis*] *Ibid* 61-3 [In Russian]
- viii. RAEVSKY G E [Instructions for Malaria Zooprophylaxis] *Ibid* 64-7 [In Russian]

The papers listed above all deal with various aspects of zooprophylaxis against malaria. This is based on the pronounced zoophilism of certain anopheline mosquitoes on account of which it is possible to establish a protective barrier of animal houses (cowsheds, stables, pigsties, etc.) between human dwellings and the mosquito breeding places. Since zooprophylaxis represents an important and in some cases the only method of protection against malaria observations and experiments have been carried out in various parts of U.S.S.R. with the view of determining the most effective method of its practical application and the various factors affecting it. It is claimed that the use of domestic animals for zooprophylaxis is only practicable in the Soviet Union.

where lives oak being common property can be fully controlled by the State

i Raevsky describes his experiences in a village of the Kabardino-Balkarian republic (Caucasus) where the chief vector is *Anopheles maculipennis* (mainly *typicus* occasionally *atroparvus* and *messeae*) In this village the average number of cattle per head of the population was about one and the animals were stabled for the night 1-1½ hours after the mosquitoes became active The best results were obtained by placing the cow houses between the mosquito breeding places and the human dwellings at a distance of 30 metres from the latter and at interval of 50 m from each other Under these conditions there was not only a considerable diminution of the number of mosquitoes found in human dwelling but also an almost complete absence of attacks by these insect on people inside the barrier Moreover the number of mosquitoes harboring sporozoites was reduced to about one-eighth

ii Working in the same locality Sheinker records the results of the zooprophylactic measures undertaken in 1940 upon the incidence of malaria as compared with 1938 It was found that there was a drop in all the malaria indices parasite rate from 15.4 to 3.5 spleen rate from 28.9 to 7.0 endemic index total percentage showing objective signs of malaria from 39 to 9.2 The percentage of fresh infections decreased in the case of the whole population from 47.9 to 15.7 and in the case of persons living within the protected zone from 43.4 to 12.0 It is suggested that in hyperendemic areas zooprophylaxis should be reinforced by drug treatment as well as by direct anti mosquito measures

iii Platono and Tarabukhin describe their experiments on two State farms of Western Siberia in 1937-40 the chief local vector being *A. maculipennis* (*messeae*) In one of the villages animal houses (containing cattle and pigs) were built according to plan viz. 6-40 m from human dwellings at intervals of 7-180 m from each other In the other village which served as a control the original housing of livestock was not interfered with In spite of the imperfection of the barrier in the experimental village it resulted in breaking contact between mosquito and man for in 1940 precipitin tests revealed no human blood in the mosquitoes and there were no fresh cases of malaria in the settlement

i Zavoronkaya deals with the protection of certain villages in the Kuibyshev region from mosquitoes (*A. maculipennis* is chiefly *messeae*) breeding in a neighbouring barrage lake In two test villages the barrier consisted of cattle sheds (about 4-7 cows per house) interposed between the lake and the houses at average distances of 5-11 m from the latter and 20 m from each other Other villages served as controls In view of the low incidence of malaria in the locality the results of the prophylactic measures were assessed on entomological grounds It was found that while in one village where the distance between the cowsheds and houses was 11 m the barrier was completely effective in the other where they were separated by 5 m only mosquitoes continued to be fairly numerous in human dwellings

v Raevsky discusses the influence of certain factors upon the effectiveness of the zoobarrier Since mosquitoes are attracted to their prey by smell it was thought that the direction of the wind was an important factor Actual tests have shown that in view of the variability of the wind in the course of the day smells are carried to water collections dispersed over an arc from 90° to 180° at a distance of 3 km

from the settlement. Therefore the flight of mosquitoes (which is against the wind) depends only upon whether they are on the windward or leeward side. In one village it was estimated that when the velocity of the wind was 1-3 on the Beaufort scale [2-12 miles per hour] the average number of female mosquitoes found in animal houses of the barrier on the leeward side of the human dwellings was 33.5 in those on the windward side 16.3 while on calm nights they amounted to 19.3. On the other hand animal houses standing very near to water collections are visited regularly by mosquitoes irrespective of the direction of the wind.

During hot summer nights the cattle are allowed to spend the night in the open. It was demonstrated that if the animals are kept 5-6 m from their sheds their effectiveness as a barrier is not thereby diminished.

vi Working in the Caucasus Rakhmanova made observations on the suitability of various types of animal houses from the point of view of their attraction for mosquitoes. The best results were obtained in well built houses with adequate ventilation (but without excessive draught) with windows and doors facing the breeding places and a thick waterproof roof. As regards the degree of attraction for mosquitoes domestic animals can be arranged in the following order (the figures indicating exposure to attacks) goat 2 calf 5 pig 10 cow 20 buffalo 60. It would appear that the degree of attraction is in direct proportion to the area of the body and the amount of warmth and smell given off by it. These factors should be taken into consideration when planning the barriers.

vii The same problem is dealt with by Polumordvinov on the basis of observations made in the Kazan province. This author found that cows represent a more effective barrier against mosquitoes than horses since the latter are much more sensitive to mosquito bites and frequently drive the insects away before they had time to feed. In constructing an animal barrier it should therefore be taken into consideration that stables are less likely to attract mosquitoes than byres. Observations made in one village showed that the presence of live stock (38 horses 82 cows 8 pigs 240 sheep 46 goats—on the average three animals per household) resulted in deflecting from man 98.7 per cent of the mosquitoes.

viii In view of the successful results of the foregoing (and other) experiments and observations it is proposed to adopt zooprophylaxis as a practical measure of malaria control in rural areas. Raevsky summarizes the position and makes a number of practical suggestions of which the following are the most important: (1) The zoobarrier consists of a row of animal houses between the mosquito breeding places and the human dwellings. (2) It is desirable that the animal houses should be situated on the leeward side of and on a lower level than the settlement if possible they should be parallel to the periphery of the settlement. (3) The distance between the barrier and human houses should not be less than 200 m (in the case of piggeries 250 m). (4) The animal houses should be separated from each other by the following gaps: byres 50 m pigsties 45 m sheep-pens 50 m. (5) The doors and yards of the animal houses should be on the leeward side. (6) In the space between the barrier and human dwelling there should be vegetation. (7) When livestock are grazed during the daytime they should be stabled not later than half an hour before sunset i.e. before the mosquitoes become active in the evening.

C. A. Hoare

RODHAIN J & DELLAERT R L infection à *Plasmodium malariae* du chimpanzé chez l'homme Etude d'une première souche isolée de l'anthropoïde *Pan satyrus verus* [Infection of Man with *Plasmodium malariae* of the Chimpanzee] *Ann Soc Bel e de Méd Trop* 1943 Mar 31 v 23 No 1 19-46 3 graphs & 3 charts (9 folding)

In an earlier paper [this *Bulletin* 1943 v 40 438] Rodhain has recorded his successful inoculation of the quartan like parasite of the chimpanzee to human beings. The result of this observation was his conclusion that this parasite of the chimpanzee was actually *Plasmodium malariae* and not a distinct species for which the name *P. rodhaini* had been proposed by BRUMPT. In the present paper are given details of the infections produced in 22 individuals with this parasite 14 of them being in series. It is noted that the infection is a mild one with relatively small numbers of parasites in the blood. Of the 22 infections 17 were of the quartan type. The majority of the patients recovered spontaneously without treatment. The average number of attacks in 12 of the cases was 11. In the series of 14 direct passages from man to man there was no evidence of any increase in intensity of the infection. The strain under observation was compared with three well-established strains of *P. malariae* of human origin. All three gave rise to more severe attacks of malaria which are less easily controlled by quinine than the chimpanzee strain. On the other hand there was no difference in the resistance to arsenobenzol. It was evident that the chimpanzee strain was one of low virulence but there was no evidence to indicate that this was due to the fact that virulence has been lost during its sojourn in the chimpanzee. C M Wenyon

PESSÔA S S B & BARRETO M P Malaria Aviária II Sobre uma raça agametocitoênica de *Plasmodium cathemerium* Hartman 1937 [A Non Gametocytogenic Race of *P. cathemerium*] *Arquivos de Higiene e Saúde Pública* Sao Paulo 1943 Jan v 8 No 17 17-20 English summary (9 lines)

Maintaining a strain of *Plasmodium cathemerium* in canaries by intramuscular injections of blood the author noticed that at the thirtieth passage gametocytes no longer appeared. This gametocyte free strain was carried on in other birds in which it continued to develop without gametocytes. It differed from the original strain in its marked asynchronism and its increased virulence and in the ragged appearance and loss of affinity for stains of the individual parasites. C M Wenyon

BARRETO M P Malaria aviária I Transmissão do *Plasmodium cathemerium* Hartman 1937 pelo *Culex fatigans* Wiedmann 1828 [Transmission of *P. cathemerium* by *C. fatigans*] *Arquivos de Higiene e Saúde Pública* Sao Paulo 1943 Jan 8 No 17 9-14 English summary

Experimenting with a strain of *Plasmodium cathemerium* maintained in tico-tocos (*Brachyospiza pileolata*) the author has obtained complete development in *Culex fatigans*. C M Wenyon

BECKMAN H & SMITH Jane The Apparent Advantage of Frequently Administered Quinine in Avian Malaria Infections *J Lab & Clin Med* 1944 Jan v 29 No 1 43-7 1 chart

By treating canaries infected with a virulent strain of *Plasmodium cathemerium* an attempt was made to obtain an answer to the question Will the continuous administration during 24 hours of a certain quantity of quinine sulphate be more curative than the same quantity administered in three doses in 12 hours? As in birds it was not possible to adopt the continuous drip method it was decided to compare the treatment with three doses of 1 mgm given at 8 a.m. 2 p.m. and 8 p.m. with treatment with 0.25 mgm given every two hours during the 24 hours. This treatment of 10 birds in each group was commenced on the fifth day following the infective mosquito bite and was continued through four days. The result showed clearly that in the case of the two hourly dosage the height of the infection was reached a day earlier and was less intense than in the three-dose series while growth rate of the parasites was retarded to a greater extent. In both the treated series at the height of the infection there were fewer parasites present than in the untreated controls. This shows definitely that a treatment approaching the continuous gives better results than the usual method of three doses in 12 hours. There would seem to be justification for the trial of continuous administration of quinine in the treatment of human malaria *C M Wenyon*

DAS GUPTA B M & SIDDONS L B Tests with Mepacrine Hydrochloride *B P* against *Plasmodium relictum* *Indian Med Ga* 1943 Jan v 78 No 1 42-3

The authors have tested the action of mepacrine hydrochloride on *Plasmodium relictum* infection in canaries. The drug (manufactured in India) was administered by tube into the crop in daily doses of 4 mgm in 0.5 cc of distilled water. Though the experiments were somewhat vitiated by the death of three out of the five birds employed enough was observed to show that the drug reduced the infection and that it had degenerative effects on all stages of the parasites.

C M Wenyon

BOCK E & OESTERLIN M Ueber einige fluoreszenzmikroskopische Beobachtungen [Observations with the Fluorescence Microscope] *Zent f Bakt I Abt Orig* 1938-39 v 143 306-18

The fluorescence microscope was first used in protozoology and bacteriology much later than in botanical work. The earlier studies were made on trypanosomes to observe whether there was any relationship between the absorption of a dye by the parasites and its chemotherapeutic action. The results were indefinite since not only active drugs but also inactive substances diffused into the parasites. Oesterlin showed that this diffusion had no significance but the specifically active drugs were absorbed after doses at or below the threshold of their activity had been given and by special parts of the parasites (blepharoplast/volutin particles). With inactive substances there was merely a physical diffusion varying with the concentration of the substances in the blood and fluorescence was only seen with high concentrations. All these observations were made on vitally stained parasites after injection of the drug into the infected animal (rat or

mouse) HAGEMAN [see *Bulletin of Hygiene* 1937 v 12 606] used the fluorescence microscope to show the viruses of ectromelia and canary pox and the present authors were able to use the same set of apparatus for their researches. They employed both vital staining (especially for malaria parasites) and stained smears for various parasites.

Observations on monkey malaria treated with atebrin and quinine—The drug were injected intramuscularly into *Macacus rhesus* monkey-infected with *Plasmodium knowlesi* and *P. vivax*. Films were examined with the fluorescence microscope and parallel examinations of films stained with Giemsa's stain were made. Greater fluorescence and better contrast with the background were obtained with atebrin than with quinine. With the former it appeared within 10 minutes after injection but not for 3 hours with quinine. With atebrin it reached a maximum within 30 minutes and this was maintained for 24 hours after which it diminished and after 22-24 hours even with the strongest dose fluorescence was very weak. The effects on the different stages of the parasite are described in detail. Atebrin, taken up by the parasites before the Giemsa stained smears show the morphological changes in the parasite that are caused by the drug.

Staining of protozoa, bacteria and viruses with fluorescent dyes—The author selected the following substances: atebrin, trypanflavin and rivanol which contain acridine; primuline which contains sulphur and a basic auramine derivative whose formula is given. The smears fixed or unfixed were stained for 5 minutes with 0.1 per cent solutions of the drugs, the primuline solution being used with the addition of 0.2 per cent phenol. They were afterwards washed with methyl alcohol to remove precipitates.

Trypanosomes, relapsing fever spirochaetes, leishmania and malaria parasites of man, monkey and bird were stained best with rivanol. *Leptospira icterohaemorrhagiae* was stained only by primuline but the ends remained unstained which seems to show that the ends of the parasite are of different composition from the rest. Primuline appears to be a specific stain for lipid and fatty substances and for this reason leishmania in spleen smears and lymphogranuloma virus in brain smears could not be distinguished by it. The fluorescent particles seen in smears containing the viruses of ectromelia and canary pox were very probably the parasites since the preparations were made from tissues free from fat. Tubercle bacilli were stained best with auramine.

The author considers that the fluorescence seen in monkey malaria treated with atebrin indicates a direct action of the drug on the parasites.

J. F. Corson

PATTON R. L. & METCALF R. L. The Demonstration of the Proteoan Parasite of Quail Malaria by Fluorescence Microscopy. *Science* 1943 Aug 20 184

Dyes which fluoresce with ultraviolet light have been used in recent years for staining tubercle bacilli and other organisms [see *Bulletin of Hygiene* 1937 v 12 606 1940 v 17 20 357 358 439 582 1943 v 18 78 1944 v 19 65]. BOCK and OESTERLIN (above) used them in studies of the action of antimalarial drugs.

[atebrin quinine and other substances on plasmodia trypanosomes leishmania and leptospira] more recently they have shown that *Plasmodium vivax* *P. nucleophilum* and *Haemoproteus* sp (from the California Valley quail) can be stained satisfactorily with fluorescent dyes [See also VON JANCsó this *Bulletin* 1932 v 29 647 HAWKING *ibid* 1939 v 36 660 and 1942 v 39 238]

In the work recorded in the present paper *Haemoproteus* sp of the quail was used Saturated aqueous solutions of six fluorochromes were applied for 2 to 5 minutes to smears fixed in methyl alcohol The results are shown in the table —

Stain	Nuclear colour	Parasite colour	Leucocyte colour	Staining intensity
Berberine sulphate	Bright yellow	Golden	Yellow	+++
Rivanol	Yellow green	Yellow green	Bright yellow	+++
Primulin yellow	Blue	Blue white	Yellow	+++
Coriphosphine O	Orange	Orange	Bright orange	++
Thioflavin	Yellow	Yellow	Yellow	++
Auramine O	Yellow	Blue white	Bright yellow	+

The apparatus is relatively simple a G E type H 4 high pressure mercury vapour lamp and a Corning filter No 5840 (transmitting light waves of 310 to 394 m μ) were used The parasites are seen as brightly fluorescent objects against a dark field *Haemoproteus* and the plasmodia of human malaria are easily seen with dry lenses at magnifications not above 200 \times and eyestrain is much diminished

J F Corson

TRYPANOSOMIASIS

DE BURGOS DÍAZ VARELA Feliciano Aportaciones al estudio de la tripanosomiasis humana en Santa Isabel de Fernando Póo [Human Trypanosomiasis in Santa Isabel Fernando Po] [Thesis] Reviewed in *Med Colonial* Madrid 1944 Feb 1 v 3 No 2 101-5

This article is a review of the author's paper on human trypanosomiasis in the Santa Isabel district of the island of Fernando Po Spanish West Africa The campaign against sleeping sickness (*Trypanosoma gambiense*) was begun in 1928 and was supported by regulations in 1933 Diagnosis was made by surveys of the population with blood examination gland puncture and lumbar puncture Travelling was controlled by passports and infected persons received treatment cards All patients whether in the early or late stage were treated with Germanin [doses not given] administered daily for 5 to 10 days patients in the

In his practice the author met with an acute case of American trypanosomiasis in a lad of 17 years. The case was clinically typical but the eye symptoms more severe than usual with exophthalmos ectropion (well shown in an illustration) and diplopia and blurred vision. Triatomidae abounded in the hut in which he lived and of 30 caught 15 were infected. Three species are found in the district. *T. infestans*, *T. spinolai* and *Triatomaplera porteri* of these the first is the most to be feared for it lives in the huts and attacks at night.

The patient was given two courses of 5 intramuscular injections each of 5 cgm of 7602 (Ac.) Bayer and all his symptoms cleared up but the Machado reaction remained positive.

H Harold Scott

ROMEIRO O dos S Ca o ag do mortal de molé tia d Chagas com sinal de
Pomana observado m Pr s do Rio Goiás [A Fatal Case of Chagas's
Disease in Pires do Rio Goiás] Bras J Med co 1943 Oct 2 & 9 v 57
Nos 40 & 41 404-5 1 fig

LEISHMANIASIS

LIPSCOMB F E & GIBSON M O J Visceral Leishmaniasis (Kala Azar) in an Adult contracted in Malta Brit Med J 1944 Apr 8 497-3

The case reported is that of an air gunner 20 years of age who contracted kala azar in Malta. It is stated that records of only four earlier cases in adults from the island could be traced. He was treated with n ostan in daily doses of 0.05 gm but owing to an uncontrollable cough the course had to be stopped when 2.5 gm had been given. After an interval of three weeks leishmania being still present in bone marrow smears 1.8 gm were administered in doses of 0.2 gm. In this dosage the cough was less troublesome. Six weeks later the clinical condition was not improved so a course of sodium antimony gluconate was given consisting of daily intravenous injections during 15 days till 86 cc had been administered. Following this treatment a steady improvement set in. When seen five months later the patient had been doing full ground duty and looked well. It is noted that though the patient had revealed a well marked syndrome of low grade fever cough adenitis splenomegaly and leucopenia the cause of his condition remained for many months unrecognized both in Malta and after his return to England.

C M Wenyon

BRAHMACHARI P N Some Observations on Brahmachari's Disease (Post Kala Azar Infection of the Skin with *Leishmania donovani*) Indian Med Ga 1913 Dec v 78 No 12 588-90

The author describes the case of a man 22 years of age who in 1919 was successfully treated for kala azar by 18 injections of sodium antimony tartrate. Two years later the patient noticed erythematous patches and small papules on the skin of the body. In 1922 the author made a note of the character and position of the skin lesions. Eleven years later the patient was again seen. It was observed that the lesions had changed in character while new lesions had appeared. It was possible to deduce the sequence of the changes which had occurred in

the individual lesions. These were firstly erythema then depigmentation followed by small reddish patches some of which consisted of coalesced red papules and finally red nodules. On the subject of treatment the author notes that certain cases of post kala azar dermal leishmaniasis respond to antimonial treatment as readily as do ordinary cases of kala azar while others are absolutely resistant. Others again occupy an intermediate position. *C M Wenyon*

BRAHMACHARI P N Post Kala Azar Infection of the Skin by *Leishmania donovani* (Brahmachari's Disease) *Calcutta Med J* 1943 Apr v 40 No 4 139-42

ROTH J Treatment of Mediterranean Kala Azar with 4-4 Diamidino Stilbene *Harefuah* Jerusalem 1944 Feb 1 v 26 No 3 [In Hebrew 47-8 English summary 48]

A description is given of a case of kala azar of a girl seven years of age a Polish refugee from Lethran completely cured with 42 intravenous injections of 4-4 Diamidino Stilbene. In addition to the specific treatment sugar calcium and albumins have been administered. No toxic manifestations appeared.

STERNFELD G Leishmaniasis of the Skin in Haifa and the North of Palestine *Harefuah* Jerusalem 1944 Feb 1 v 26 No 3 [In Hebrew 43-4 English summary 45]

The author analyses 161 cases of Leishmaniasis in Haifa the spreading of the disease in that city and in the North of Palestine and reaches the following conclusions:

1 Leishmaniasis an endemic disease in Palestine is continually spreading. Haifa and the Northern part of Palestine which were heretofore considered free from Leishmaniasis have also become nests of this disease during recent years.

2 The spreading of the disease from its original foci in the neighbourhood of the Dead Sea and Jericho is apparently connected with the industrial development of this district. Immigration from affected regions like Aleppo etc. and the habit of the Arabs to leave it untreated are additional contributory factors to the spread of the disease.

3 New centres of Leishmaniasis are bound to appear in the North if the sporadic cases will not soon be discovered and radically treated.

PENA CHAVARRIA A SÁENZ HERRERA C & CORDERO E El tartaro emético por vía oral en la leishmaniasis cutáneo mucosa especialmente útil en el tratamiento del niño [Oral Administration of Tartar Emetic for Cutaneous Leishmaniasis especially useful for Treatment of Children] *Rev Méd de Costa Rica* 1943 Jan v 5 No 105 361-8 7 figs

The authors record the successful treatment of cutaneous leishmaniasis by oral administration of a solution of tartar emetic. The solution was prepared by dissolving 2 gm of the drug in 80 cc of chloroform water. In this strength one drop of the solution contained approximately 1 mgm of tartar emetic. In children treatment was commenced by giving one drop a day. This dose was increased by a drop every three or four days till the limit of tolerance without diarrhoea or

vomiting was reached. In adults the initial dose was 5 to 15 drops according to the constitution of the individual. As in children the dose was increased to the limit of tolerance. Complete healing was obtained in three to four months in a number of illustrative cases described.

C. M. Benson

FEVERS OF THE TYPHUS GROUP

FELIX A. Technique and Interpretation of the Weil-Felix Test in Typhus Fever. *Trans Roy Soc Trop Med & Hyg* 1944 Mar 1; 37 No 3 321-41 [1944 ref.]

This valuable paper has been written in response to requests [including one by the reviewer].

By using Rickettsial suspensions for agglutination and complement fixation tests it is already possible to differentiate some of the types of typhus fever which give the same response to *Proteus OX* organisms but for the present the Weil-Felix test is the only one generally available.

In 1916 and 1917 the author carried out a large series of tests in Poland and Turkey using *Proteus* *OX19* and *OX2* about 75 per cent of the cases gave significant reactions to *OX19* by the 4th or 5th day and later had high maximum titres mostly over 1:2000 shortly before or shortly after defervescence. The remaining 25 per cent showed positive reactions about the 6th or 7th day—exceptionally later. The maximum titres in the latter group were low—usually less than 1:500. The type of the titre curve was generally related to the clinical course of the illness: (a) moderately severe cases usually showed high titre reactions; (b) the most severe cases gave very low titres; and (c) the mildest cases might have very low or very high titres.

The upper limit of agglutination with *Proteus OX19* in persons not suffering from typhus is regarded by most workers as 1:100 but by some as 1:200—though in countries where the disease is endemic it may be considerably higher.

After high titre reactions residual agglutinins usually persist for three to four months so that retrospective diagnosis is often possible but after low titre reactions there may be a negative response almost immediately after recovery.

Persons who normally agglutinate *OX19* in titres of 1:50 to 1:100—or who have residual agglutinins in titres of 1:100 to 1:200—and who are attacked by typhoid or other febrile illness do not show any increase in the titres during these fevers.

After inoculation with vaccines made from Rickettsiae of the *OX19* group (*R. prowazekii* and *R. mooseri*) agglutinins often appear but the titres are relatively low and of varying persistence—some vaccines do not stimulate agglutinin formation. In these inoculated persons a rising curve of *OX19* agglutination is diagnostic of typhus—the curve is often of the low titre type.

Standardized alcohol-treated suspensions from the Standard Laboratory (Medical Research Council) at Oxford are strongly recommended. Round-bottomed test tubes about $2 \times \frac{1}{4}$ inch are preferred to the Dreyer tubes in which the deposit is not easy to see. Low

dilutions of 1-25 and 1-50 should always be included in the first tests. The tubes are incubated at 37 C for two hours and are read after 22 hours at room temperature or in the tropics after the same time in the ice chest.

Readings with a lens at the end of two hours often help in the early detection of high titre reactions. The titre is stated in terms of any agglutination visible to the naked eye. There should be a control by the inclusion of sera of known titres. High temperature incubation of 50 to 52 C is not recommended.

Infection by *Pr. tul. aris* may give rise to positive reactions. One observer states that it may also cause agglutination of *A. proa. ek*.

Inhibition of the agglutinins at low titres may occur with fresh sera. These sera may react after heating for half an hour at 45 C.

Complete agglutination (total in the Dreyer scale) at 1-80 is significant except in persons inoculated with Rickettsia vaccine during the preceding two or three months. In these complete agglutination in a titre of 1-200 is significant. In persons from endemic areas titres in excess of 1-200 may occur in the absence of typhus infection.

The essential point is that the titre should show a pronounced rise in the course of 48 hourly tests. A constant titre throughout the illness is evidence that the disease is not typhus.

Complete agglutination at 1-25 or 1-50 is as decisive when it follows earlier negative reactions as high titre agglutination.

Inapparent cases can be diagnosed with certainty by rising and falling titres.

The rapid slide agglutination tests are useful in special conditions.

In flea borne murine typhus, often inappropriately called endemic typhus, the reaction is similar to that in louse borne typhus. It occurs just as early as in mild or modified louse borne typhus.

In tick borne typhus the reactions are highly irregular. Positives with O\2 only or with O\2 in higher dilutions than with O\19 are usually confirmatory of boutonneuse fever but when the reaction to O\19 is the stronger no help is obtained. The reaction is often much delayed. In India suspensions of O\A must also be used.

In mite borne typhus O\A is the only *Proteus* organism that responds but titres below 1-160 are not significant and suspensions are liable to become unsatisfactory on keeping. Adequate controls are needed to exclude false positives. The reaction is often delayed. The maximum titre is usually reached in the 3rd or 4th week though in India the suspensions prepared by BRIDGES give earlier responses. Rising and falling titres should be looked for.

[The following comments do not deal with the main part of the paper which will be warmly welcomed as an invaluable guide to the interpretation of the Weil Felix reactions when carried out in the conditions laid down by the author.]

In the paper a table is included which shows the provisional classification of the typhus group of fevers already proposed by the author.

This classification is based on the types of agglutination reactions to the *Proteus* organisms O\19, O\2 and O\A. These reactions are regarded by the author as indicating the immunological sub group to which each kind of typhus fever belongs and therefore as constituting the most suitable basis for classifying the fevers. Acceptance of this view involves the difficulty that many of the individual cases belonging to the indeterminate sub group give the same reaction as cases belonging to the main O\19 sub group. Further the *Proteus*

reactions do not differentiate between louse-borne and flea borne typhus whereas the truly specific Rickettsial agglutination and complement fixation reactions do so and also appear to correspond with the classification based on the arthropod vectors. Those who insist on having a classification based on the characteristics of the causal Rickettsiae will not be likely to accept a non specific agglutination response as a suitable basis.

In the table the louse-borne and flea borne typhus fevers of South Africa are shown as occupying the very anomalous position of belonging to the Indeterminate sub-group although the typhus fevers transmitted by the same insect in all other parts of the world belong to the OVI9 sub group. It is worth noting however that GEAR as a result of his own investigations maintains that these fevers in South Africa are identical in all essential respects including their serological reactions with corresponding fevers elsewhere and so conform to the classification according to the arthropod vectors.

Recent work has strengthened the opinion that each of the four arthropod borne main types of typhus fever constitutes an essentially unitary type whether considered from the aetiological, clinical or epidemiological point of view. The variations that occur in each type are not generally regarded as amounting to specific differences with the possible exception of the tick borne Q fever whose status has not yet been finally established.

John W. D. Meade

BRIDGES R. F. Note on the Preparation of Suspensions for the Weil-Felix Test. *Transactions Royal Society of Tropical Medicine & Hygiene* 1944 Mar 1 37 No 5 343-4

This paper is a suitable complement to the article abstracted above; it contains a concise description of the methods now employed at the Standards Laboratory in the preparation of *Proteus* suspensions for the Weil-Felix tests.

The paper must be read in the original text by laboratory workers; it does not contain a superfluous word.

The general lines of the technique are as follows. From a selected 24-hour colony of a pure O-strain a broth culture is made and is used after 24 hours incubation to inoculate a large agar surface.

The growth after 24-hours incubation is washed off with a little saline, filtered through cotton wool and treated with 96 per cent alcohol which is added in the proportion of four volumes to one volume of the suspension. The mixture is well shaken for one hour, then the alcohol is removed by a combined process of decantation, centrifugation and pipetting. For OVI9 and OVI2 the remaining deposit of organisms is suspended in sterile saline in screw-capped bottles and shaken till no trace of granularity remains.

A 2 per cent solution of buffered formal saline is added to make a 0.25 per cent concentration of formalin and the suspension is standardized by adding more saline and 2 per cent buffered formal saline to produce a density equal to that of 4.500 million *Bacteri coli* per ml. and a formalin concentration of 0.25 per cent.

For OVA distilled water instead of sterile saline is used for resuspending the alcoholized organisms and all further dilution is made with distilled water. But the 2 per cent formalin may be added in the form of buffered formal saline as in the case of the other organisms.

John W. D. Meade

SANCHO LOBO M. Notas sobre una epidemia de tífus exantemático
[Notes on an Epidemic of Typhus Exanthematicus] *Med Espanola*
1943 Sept v 10 No 56 321-33 4 graphs [Bibliography]

This note deals with an epidemic of louse borne typhus in Cordova in 1942. As so often happens the first cases were missed they were mistaken for influenza so that the epidemic had got well under way before control measures could be initiated.

Even during the epidemic many of the milder cases must have been missed owing to concealment prompted by fear of irksome restrictions.

Some of the features of the 47 cases treated in hospital by the author were as follows.—The fever curve usually showed a gradual decline with moderate daily remissions from the end of the first week.

The rash varied from a few inconspicuous roseolae to abundant large haemorrhagic macules. In three cases no rash was seen.

There was vomiting at the onset in 16 cases.

A special feature was the occurrence of a bilateral tender spot at the outer borders of the recti muscles above the level of the umbilicus. This was observed in all the cases and in nearly all there was also defensive rigidity on pressure over the recti muscles above the umbilicus whereas the lower part of these muscles remained flaccid.

The Weil-Felix reaction was uniformly negative during the first week. In four cases only it was positive on the 11th or 12th day. In three it was negative on the 13th to the 15th day and positive on the 17th to the 19th day. In one case it was negative on the 10th and 16th days and reacted on the 28th day at a titre of 1-500. In only one of the surviving cases it was persistently negative being tested on the 18th and 30th days.

Completely negative reactions were frequent in the fatal cases [presumably because the patients did not survive long enough]. The maximum titre observed was 1:1000.

The severity of the attacks ranged from inapparent or very mild to fulminating and rapidly fatal. The former were in young children who belonged to affected families. There were eight deaths (17 per cent) of these five were in persons between the ages of 60 and 83 the ages of the three other patients who died were 25, 40 and 42.

Many drugs were tried but none appeared to influence the course of the disease except for temporary benefit from strychnine, camphor and serum. The kind of serum used is not stated.

John W. D. Megaw

LARSEN K. & LEBEL H. A Small Laboratory Epidemic of Typhus
Fever in Copenhagen. *Acta Med Scandinavica* 1943 v 115
No 5 524-36 5 figs [12 refs]

A description is given of four cases of laboratory infection [apparently at the State Serum Institute, Copenhagen] in persons who had been working in a room in which mouse lung vaccine was being prepared from *Rickettsia prowazekii*. Two of the patients had been engaged in the preparation of the vaccine and had been exposed to droplet infection resulting from the explosive expiratory efforts of the mice during intranasal instillation of the infective material. The other two had been working in a room in which the infected lungs of the animals were being ground with sand in a mortar. One of the latter pair of patients had not been vaccinated against typhus fever. He had

a severe attack typical in all respects and with a Weil Felix titre rising from 0 and reaching 1-400 on the 13th day and 1-6400 on the 18th day.

The attacks in the other patients who had been vaccinated were mild. In one the Weil Felix reaction was negative throughout. In another the titre was 1-50 on the 10th day and 1-100 on the 13th day, having been 0 on the 7th day. In the fourth case the titre rose to 1-400 on the 13th day, having been 1-100 on the 9th day. In the last case there was only slight fever lasting three days.

From a consideration of these cases and a study of the literature the authors incline to the view that low titres and negative reactions are more likely to occur in vaccinated than in unvaccinated persons.

Droplet infection is regarded as the most likely explanation especially in the first two cases. Other possibilities are getting infected material on their hands, or inhalation of infected dust resulting from the drying of droplets caused by the grinding process.

Unfortunately, two guinea-pigs which had been inoculated intraperitoneally with blood from two of the patients had to be destroyed because the authorities of the State Serum Institute would not allow them to be kept on the premises. [This is a great pity because more light is needed on the very important question whether *Rickettsiae* can be transmitted from persons suffering from attacks modified by previous vaccination.]

The authors remind us that most of the workers engaged on experimental work with typhus *Rickettsiae* contract typhus fever sooner or later. RICKETTS and PROWSEK died of the disease and ZINSSER, MOOSER, NICOLLE and DA KOCHA LIMA were among those who became infected.

The only other laboratory epidemic due to *R. prowseki* that has been recorded was the one reported by CILCA *et al.* in Rumania. All the others were caused by *R. mooseri*. John H. D. Meera

HEINBERGER Beobachtungen bei Fleckfieber. 3 Mitteilung. Echtes Rezidiv oder Verlauf in Schüben? 4 Mitteilung. Der protrahierte Kollaps. 5 Mitteilung. Versuche mit Iervitin. [Observations on Typhus. 3 True Relapse? 4 Prolonged Collapse. 5 Effect of Pervitin.] *Deut. med. Woch.* 1943 Nov. 12, 1-69 No. 45/46. 775-6 2 figs. 777-9 3 figs. 779 4 figs.

This paper is in continuation of one briefly referred to [this Bulletin 1944, 1-41, 384] on the subject of clinical observations of typhus fever.

The first matter dealt with in the present article is the question whether relapses ever occur in the disease. Two cases are described as being possible examples of relapses. They were the only ones of the kind in a series of more than 400 seen by the author.

In one there was a mild attack of fever lasting seven days in which there was a fleeting and scanty roseolar eruption and a Weil Felix reaction at a titre of 1-100 on the 10th day. After 14 days of freedom from fever the patient had a second febrile attack complicated by bronchopneumonia and ending with death on the 19th day.

The other patient had a relatively mild attack of fever lasting 13 days and ending by a very prolonged slow lysis. There was a scanty roseola and the Weil Felix reaction is stated to have been positive but the

titre is not specified. After four days' absence of fever a second severe attack occurred and the patient died on the 13th day.

The author discusses the question whether these were examples of genuine relapses or something that he calls *Verlauf in Schüben* which seems to mean a two phase type of febrile course such as occurs in a number of other virus diseases such as dengue. [There are two weak points in the discussion: one is that the information supplied hardly justifies the assumption that the attacks of fever were proved to be typhus: only one Weil-Felix test was carried out in each of the cases; the titre in one case was 1-100 and in the other it was not stated; no blood cultures or other laboratory investigations into the causes of the fevers were done. The other weak point is that typhus is not one of the fevers caused by a filter passing virus.]

The next subject dealt with is the occurrence of prolonged collapse in typhus fever: this is often accompanied by an anomalous fall in the temperature by lysis; the circulatory failure does not respond to drugs like adrenaline or pituitrin and the prognosis is very unfavourable.

The third matter discussed is the treatment of collapse in typhus fever by pervitin which was tried in 47 cases in the hope that its known action as a nerve cell stimulant might yield better results than cardiovascular stimulants like strophanthin.

The drug seemed to be useful in some of the cases in which it was given early in the collapse but the author admits that a decision whether to give or withhold the drug in cases of threatened collapse must remain a matter of personal opinion on the part of the physician.

John W. D. Megaw

MORAGUES V & PINKERTON H. Fatal Murine Typhus Infection in the dba Strain of Mice with Observations on Strain Variation in Susceptibility. *J. Exper. Med.* 1944 Jan 1 v. 79 No. 1 35-40.

The experiments recorded in this and the following paper show that mice inoculated with a given dose of murine typhus *Rickettsiae* may develop either an inapparent illness or a disease with 100 per cent mortality depending on the strain of mouse used and the environmental temperature at which the mice are kept: they may thus explain the conflicting results obtained by various workers with murine strains in mice.

The strains of mice used in most of the experiments are described as dba and Swiss strains: the former was an inbred strain; the latter was pen-mated.

Of 53 dba mice inoculated by the intracerebral route with a typical murine strain of *Rickettsiae* from Mexico 28 died within five to six days of severe *Rickettsial* infection and some of these had a *Rickettsial* meningo-encephalitis which was serially transmissible. All the mice became seriously ill.

Of 33 Swiss mice inoculated with the same material and in exactly similar conditions none died and only three became ill. The room temperature in both cases was 60-80 F.

In another set of experiments mice were inoculated intraperitoneally with infected brain substance and kept at a temperature ranging from 67-73 F. In this all the 42 dba mice died in six to seven days and 10 of 16 Swiss mice died in six to 11 days.

Two other strains of mice, A albino and brown agouti, corresponded with the Swiss strain in their tolerance of infection.

John W. D. Megaw

MORAGUES V & PINKERTON H Variation in Morbidity and Mortality of Murine Typhus Infection in Mice with Changes in the Environmental Temperature *J Exper Med* 1944 Jan 1 v 79 No 1 41-3

In the above experiments it was found that the environmental temperature conditions had a pronounced influence on the course of the infection.

This influence as clearly shown by experiments on 44 dba mice inoculated by the intraperitoneal route with identical doses of the same infected material. One lot of 22 was kept at 65-73 F and all the mice died. Among the other 22 kept at 85-98 F only two died and 10 others had light infections.

The influence of temperature on 61 other mice was analysed and although the conditions were not strictly comparable it was found that the average severity of the disease resulting from given types of inoculation varied inversely with the height of the atmospheric temperature within the ranges employed for the tests. For example 4 of 13 dba mice died when kept at 85-98 F after heavy intraperitoneal inoculation whereas all of 18 dba mice died after a corresponding heavy though not identical inoculation when kept at 70-80 F.

The bearing of the experiments on the treatment of typhus fever in man is discussed and while it is suggested that the febrile reaction in also pointed out that the specially abundant multiplication of Rickettsiae in the skin may be due to the relative coolness of the surface temperature and that a high external temperature may be found to inhibit the development of the organisms.

CLAVERO and PEREZ (1941) have suggested that the severe reactions and deaths from *Blanc's* vaccine in Chile might be due to climatic conditions. The authors suggest that by using different strains of mice and controlling the environmental temperature it may be possible to secure conditions in which any desired degree of mortality will result from inoculation with murine typhus and that such conditions will have obvious advantages in estimations of the value of therapeutic measure in typhus infection.

John W D Mac

DERRICK E H The Epidemiology of Q Fever *J Hygiene* 1944 Apr v 43 No 3 357-61 1 fig [18 refs.]

This paper consists of a fully-documented summary of the results of the investigations into the transmission of Q fever in Queensland up to the suspension of the enquiry in 1942.

The disease as described by Derrick in 1937 (this Bulletin 1938 v 35 67) as a new fever entity and as given the name Q fever. In the same year BURNET and FREEMAN (this Bulletin 1938 v 35 63-83) described the causal Rickettsia *R. burnetii* and in the following 10 years these three workers with SMITH and BROWN described animal inoculation and agglutination tests for its diagnosis. All the above named workers collaborated in the further research into the transmission of the disease [see this Bulletin 1940 v 37 553-563 581 1941 v 38 208 447 690 1943 v 40 307 388 601].

Between September 1933 and August 1942 176 cases were recognized, all but two of the patients were males between the ages of 10 and 64 years. There were three deaths.

The disease was confined to a strip of coast in south-east Queensland 129 of the patients lived in Brisbane and all but six of these were associated with two meat works at the larger of which there were 116 cases among about 942 employees. By far the highest incidence was among meat inspectors whose special susceptibility was believed to be due to their having recently entered the zone of risk so that they had probably not suffered from previous attacks. All classes of employees were attacked including carpenters visiting truck drivers a laundry man and an electrician. The incidence was haphazard and spasmodic and was not seasonal.

The most plausible explanation of the peculiar incidence of the disease was that infection was acquired by the inhalation of dried faecal dust from infected ticks as had already been suggested by HORNIBROOK and NELSON [this *Bulletin* 1941 v 38 691] in the case of a laboratory outbreak of American Q fever at the National Institute of Health Washington. Four laboratory workers at Brisbane were attacked possibly in the same way.

Of the 47 rural patients 32 lived or worked on dairy farms the others were associated with conditions of life in farms and forests.

There was no evidence of man to man transmission in any case.

Three of 103 bandicoot rats (*Isodon torosus*) were found to be naturally infected also 6 of 502 ticks (*Haemaphysalis humerosa*) from the affected area. By agglutination tests evidence of previous infection was found in 39 of 180 bandicoot rats and in 14 of 984 cattle in the area.

All species of bush animals tested (7 rodents and 3 marsupials) were found susceptible to experimental inoculation.

In addition to *H. humerosa* which does not bite man three other ticks *H. bispinosa*, *Rhipicephalus sanguineus* and *Ixodes holocyclus* were found to be potential vectors.

Natural transmission of infection was thought to be chiefly as follows—Rat to rat by *H. humerosa* and probably by *I. holocyclus* rat to man and rat to cattle by *I. holocyclus* cattle to cattle by *H. bispinosa* cattle to man by *Boophilus annulatus microplus* and *H. bispinosa*.

The dog tick *R. sanguineus* was thought to be a potential vector from dog or cattle to man.

Transmission from ticks to their offspring through the egg was not found to occur.

[The valuable research summarized in this paper is important not only because of its bearing on the problem of the arthropod borne Rickettsial infections but also because Q fever and perhaps other related fevers may be found to have a wide distribution and to have escaped recognition up to the present time. All the work referred to in the paper has already been dealt with in this *Bulletin* but it is believed that the above summary will be found useful. It is to be hoped that the enquiry will be resumed after the war.]

John W. D. Megaw

FRYST K. & PORTIUS W. Neurologische Beobachtungen bei Wollhynischem (Funftage) Fieber [Observations on the Neurological Features of Trench Fever] *Klin. Woch.* 1943 Nov 13 v 22 No 46/47 692-5

This paper contains a long list of the nervous manifestations observed in trench fever.

BARTONELLOSIS

MAYER M. Sobre la etiología de las bartonellosis especialmente de la fiebre de Oroya [On Oroya Fever and the Bartonellosis] *Rev. Sanidad y Asistencia Social* Caracas 1941 Dec v 6 No 6 863-73 3 figs [16 ref.]

A Conference paper clearly and interestingly written treating of *Bartonella* and the bartonellosis in man in the dog and the mouse by one who has himself done much work on the subject. He traces the history of the disease from the time of the writings of Zarate in 1543 on cases of *berr gas* at the time of Pizarro's conquest of Peru down to Patino's description of Guaitara fever in 1939 [see this *Bulletin* 1940 v 37 271 587 583 1941 v 38 209 695]. Nothing fresh is brought forward but in view of the fact that no satisfactory treatment is at present known the author pleads for further research chemical and otherwise for discovery of a remedy. *H. Harold Scott*

LASTRES J. B. & ANGLAS QUINTANA P. Síndrome de paraplejia espástica en la verruga peruana [Spastic Paraplegia complicating Verruga peruviana] *Rev. Neuro-Psiquiatria* Lima 1943 v 6 No 2 192-204

This contribution is of particular interest because text books make no mention of nervous diseases complicating verruga or Oroya fever. As long ago as 1895 ODRIOZOLA and CASTILLO reported the case of a man 37 years of age with *Bartonella* infection who suffered from spinal pain weakness pain in the leg giddiness tremor of the hands and arms and ODRIOZOLA stated that Carrion's disease may cause neuritis and obstinate neuralgia. In 1936 Lastres recorded a case of verruga with anterior poliomyelitis.

The case recorded in the present paper was in a man of 24 years who was suddenly seized with a shivering attack thought to be influenzal. After six weeks treatment he left hospital although he did not feel by any means well. In another four months during which he felt vaguely ill he had a return of chills and fever with nausea and vomiting and was mentally dull his legs felt weak and he had to use a stick for walking. Verruga nodules appeared and the symptoms of this disease were quite clear and typical. Then very definite paraplegia set in at first flaccid but soon becoming spastic. The verruga condition got better running its usual course but the paraplegia did not clear up—in fact it also ran the usual course. Superficial sensation was not affected but deeper vibratory sensation was lost on both sides there was no incontinence of sphincters ankle and knee clonus were marked. Wassermann and Kahn tests proved negative. He had been under observation for nearly two years when last reported upon and though there may have been a little improvement this may have been apparent only. He still had to use sticks for walking. [Though not mentioned in text books it is presumably possible that a nodule or a haemorrhagic focus might involve the spine or meninges in the same way as the mucous membranes and so give rise to these nervous system complications.] *H. Harold Scott*

HOWE C & HERTIG M Prophylactic Immunization against Carrion's Disease *J Immunology* 1943 Dec v 47 No 6 471-82 2 figs (1 map)

Though the possibility of immunization by vaccines against Carrion's disease has been mentioned no actual investigation has hitherto been reported. The establishment of military guards at certain bridges on the Central Railway of Peru in the verruga zone afforded an opportunity of which the author took advantage. The vaccine was prepared from four strains of *Bartonella bacilliformis* three from Oroya fever patients and one from a sandfly grown on Geiman's proteose blood agar [see this *Bulletin* 1944 v 41 209]. Twenty one guards were bled for serum and culture on the day of departure for their posts and each received 1 ml of the vaccine a week later 19 were given a second injection and 2-3 weeks later six received a third inoculation. Prior to the first inoculation haemoculture was negative in all cases and none of the sera contained agglutinins for *B. bacilliformis*. Within 17 days of exposure to infection 13 had sera which agglutinated but the blood cultures were still negative. Later observations revealed that 12 of the original 22 inoculated developed positive blood cultures and presented symptoms of infection—slight fever chills headache bone and joint pains and five showed an eruption scanty in three of them. Generally the symptoms were mild and rarely caused interruption of military duty. Two had to go to hospital but one only was kept in for any length of time over one month. Comparison is drawn between these guards and those of the preceding 18 months none of whom had been vaccinated. Three fourths of one group of unvaccinated guards had contracted the disease during one month's exposure and nine tenths of another group became infected during four months exposure two thirds of the latter being incapacitated with fairly severe illness. It is shown that vaccination does not prevent infection but does definitely moderate the severity of the disease. *H Harold Scott*

DENGUE AND SANDFLY FEVER

- I ENRIGHT J R Dengue Fever I *Hawaii Med J* 1943 July Aug v 2 No 6 293-5
- II NANCE F D Dengue Fever II Review and Report of Three Cases *Ibid* 295

1 An analysis is given of certain features of 141 cases of dengue fever which occurred among civilians in Honolulu in 1943.

Most of the patients were treated in their own homes the others were seen in hospitals. The data were obtained from various sources and the significance of the figures shown under the headings doubtful or no history cannot well be estimated.

Some of the findings are shown in the table —

LIVSHITZ J M Recherches sur la fièvre pappataci Mémorial IX
Matériaux sur l'immunologie de la fièvre pappataci [Recherches
on Sandfly Fever Part IX Immunity in Sandfly Fever] Med
Parasit & Parasitic Dis Moscow 1937 v 6 No 6 938-43
[In Russian French summary 943]

During the expedition for the study of sandfly fever in 1937 the author made a number of observations and experiments on immunity in the disease the result of which are recorded in this paper. Practically 100 per cent of persons not previously exposed were found to be susceptible to infection with virulent serum all became infected while of 65 mental patients similarly inoculated 75.3 per cent acquired an infection. Since in the latter group no data were available regarding previous contact with the disease it is thought that some of the non susceptible patients may have been immune. The incidence of natural infection as observed in 1936 persons who were newcomers in the endemic area. About 50 per cent of these were subsequently admitted to hospital with sandfly fever. It is reckoned that many more were actually infected but these did not report for treatment since their temperature was below 37.5 C. The following results were obtained in observations on acquired immunity. Of 416 persons who had recovered from a natural infection 22.8 per cent became infected in the course of the same epidemic season. Furthermore 22 volunteers who had recovered from an experimental infection nine became naturally infected during the same season. Among 86 vaccinated persons the rate of reinfection was 34.8 per cent. Other observations concern a group of 30 persons all residents in an endemic area 18 of these had sandfly fever 3-4 years previously whereas 12 denied previous infection. In this group 70 per cent did not react to experimental inoculation of the virus 16.6 per cent reacted feebly while 13.3 per cent became infected. In another experiment 15 mental patients who had recovered from an experimental infection were success fully reinfected 1-3 months later.

From all these observations it is concluded (1) that a single infection may afford protection for a period of 1-3 months (2) that of persons who had recovered from sandfly fever not less than 20 per cent could be reinfected in the course of the same epidemic season (3) that there is a high degree of immunity in persons resident in endemic areas
C 4 Hoare

PLAGUE

- 1 KAMAL A M On the Epidemiology of Plague in Assiut Province in the Years 1938-1939 J Egyptian Pub Health Ass 1941 Jan 1-30
 - 2 — GAYED I & ANWAR M On the Epidemiology and Treatment of Plague in Egypt The 1940 Epidemic Ibid 31-103 8 maps 2 graphs 41 charts & 3 photos
 - 3 — & GAYED EL DIN EL HEFAY A Rats in Egypt and the Effect of Local Squall (Urgina-Scilla Maritima) Ibid 105-29 8 figs Appendices I and II 139-46 1 sketch & 19 figs
- Articles which have already appeared in the Journal of the Egyptian Public Health Association 1941 are here combined in a booklet

reprint They refer to plague epidemiology, symptomatology and treatment in general with some application to the Assiut Province. Some of the points may be extracted from these three articles:

i. Egypt is endemically infected with plague and as cases occur nearly every year it must presumably be regarded from the point of view of a potentially epidemic centre. Epidemic characters may prevail in one province or another from time to time and discussion in this first paper relates to the Assiut Province for the years 1938-1939. A special contention of the author is that the pigeon houses built on the roofs of dwellings are very attractive to rats and thus indirectly contribute towards the prevalence of rat plague.

ii. The incubation period of plague is a datum of considerable importance and put down by international convention as six days. According to the authors this period should be extended. Their experience was of cases appearing in contacts left in their homes on the 13th day. They have to admit however that it is very difficult to rule out a new infection. Treatment by serum was well tried out and the dosage was high—not less than 80 cc daily and in some cases intravenously. A trial was also made of sulphapyridine 2 gm on admission followed by 1 gm in two hours and then 1 gm every four hours. Finally it seems to have been decided from the figures that a combined treatment of serum and sulphapyridine was the most successful.

iii. Some interesting observations and some correspondingly interesting illustrations of the rat in Egypt are among the subject matter of this third paper. In ancient times the Egyptians worshipped the enemies of the rat and this is apparent on their sculptured monuments. Among the enemies were the cat and the snake. Most proprietors of food stores at the present day in the Egyptian port towns keep ferrets which are easily domesticated to kill rats. In this article also there is reference to the use of a local squill preparation *Urginea* (*Scilla*) *maritima* in place of the usual raticide. Experiments have shown it to be effective and of course it is cheap. It has also been found to be less poisonous to chickens and rabbits than the foreign squill. Baits containing 5 per cent squill powder are used.

Two appendices are attached: one a resumé of the routine anti-plague measures adopted in Egypt and the other on data of plague investigation.

W F Harvey

ROUBAUD E & GIRARD G. Observations sur deux pulicides de la faune de Madagascar [Two Fleas of the Fauna of Madagascar] *Bull Soc Path Exot* 1943 Oct 13 v 36 No 9-10 279-81

The two fleas in question are *Paractenopsyllus keruisteli* described by WAGNER and *Synopsyllus fonquerni* described by WAGNER and ROUBAUD. The first of these was found originally on dogs and domestic rats, is closely allied to *Ctenopsyllus muscui* [*Leptopsylla segnis*] and is more widely distributed as an ectoparasite than was at first realized. It has been recognized on an insectivore of a collection made as far back as 1910 *Orizoryctes tetradactylus*. There is good reason to believe that this flea infests many species of mammals in the forest region of Madagascar. The same applies to *Synopsyllus fonquerni* which was originally identified on a small lemur *Microcebus myoxinus* but has now had its infestation range extended to other mammals. These fleas the

authors consider may be factors in local epidemiology and vectors of sylvatic plague H. F. Harvey

CARTER C. L. Bubonic Plague on the Island of Hawaii. *Hawaii Med J*
1943 Jul Aug 2, No 6 296-8

An account of the clinical features

KEYS T. E. The Plague in Literature. *Bull Med Libary Ass* 1944
Jan. 32, No 1 35-56 1 fig (47 refs)

BACILLARY DYSENTERY

DREYFUSS F & GUREVITCH J. Serological Examination and a Cutaneous Test in the Diagnosis of Bacillary Dysentery. *Trans Roy Soc Trop Med & Hyg* 1944 Feb v 37 No 4 263-70 1 fig

The authors state that the laboratory diagnosis of bacillary dysentery is beset with difficulties associated particularly with the poor viability of the organism outside the body. They carried out agglutination and skin tests in 26 cases of bacillary dysentery (the causal organism was isolated in 16) and in a control series consisting of 12 cases of enterocolitis, 8 cases of amoebic dysentery, 5 of spastic colon, 7 of ulcerative colitis and 11 cases of various other disorders. A titre of 1/100 was accepted as diagnostic in agglutination tests for Flexner infections and was present in 20 of the 25 Flexner dysenteries but not before the 7th to 10th day of infection. A positive reaction was also given by a small proportion of the control series. The skin test consisted of local intradermal inoculation of 0.1 cc of a Flexner vaccine containing 50 million organisms per cc. A positive reaction consisted of local infiltration and redness sometimes exceeding 3-4 cm in diameter but as small and doubtful reactions were common in the control series this test is probably of little practical value. [The authors seem to be unaware of the value of desoxycholate-citrate agar which allows bacteriological diagnosis of bacillary dysentery in practically 100 per cent of cases.]

Robert Cruickshank

JANA A. P. A Study of Choleraform Disease in the Typhoon Area of Contal. *Ind an Med Ga* 1943 Dec v 78 No 12 597-8.

About two weeks after a cyclone had struck the district of Contal, much all the tanks, wells and pools were polluted by vegetation and animal carcasses washed into them. There occurred an outbreak of a disease which clinically resembled cholera except that rice-water stools were rarely seen. Generally the patients were afebrile, probably because they were in poor condition, presumably as a result of exposure and perhaps starvation resulting from the cyclone and the inundations, and in most of them vomiting quickly supervened. Suppression of urine was observed.

The author discusses the diagnosis and argues that the disease was probably a fulminating form of bacillary dysentery rather than cholera. Anti-dysenteric serum seemed to have a distinct effect in curing the patients, presumably because persons who had recently been vaccinated against cholera and bacillary dysentery was endemic.

in the area [There is no record of bacteriological examination but it is easy to understand that under such conditions laboratory work would be impossible unless special arrangements were made]

Charles Wilcocks

BOYD J S H & PORTNOY B Bacteriophage Therapy in Bacillary Dysentery *Trans Roy Soc Trop Med & Hyg* 1944 Feb v 37 No 4 243-62 1 diagram [25 refs]

Conflicting reports on the value of specific bacteriophage in the prophylaxis and treatment of bacillary dysentery have appeared in the literature which is reviewed in this paper. It is noteworthy that those who found bacteriophage therapy beneficial usually had no adequate control series while those who had instituted this check reported guardedly or unfavourably on the results obtained. The advocates of phage therapy in turn criticized the disappointing results by saying that the phage was too weak or non specific or not prepared against the local strains or was given too late in the course of the infection.

Bacteriophage was apparently the standard treatment for forward troops of the German army in Africa. The preparation used was *Ruhr bakteriofagen polyvalent* prepared by Bayer and large quantities were captured at El Alamein. This preparation was found to have a high potency against most of the dysentery strains prevalent in North Africa at that time. Boyd and Portnoy therefore decided to use it in a controlled experiment on German prisoners of war. Each P O W camp consisted of a number of sections or cages which were more or less identical in size feeding and sanitary arrangements and medical care. Ill patients were admitted to the camp hospital from which if the illness was serious or likely to continue for some time the patient was transferred to a large P O W hospital attached to the British hospital. Thus while diarrhoeal conditions were all admitted to the camp hospital cases of clinical dysentery were passed on to the special hospital. Two series of cages in a camp were chosen for the test. Bacteriophage was given orally to one group in 15 cc doses three times a day for two days and 10 cc three times a day on the third day. This treatment was begun on admission in every patient who reported sick with diarrhoea. Patients in the control group were given the standard saline treatment for dysentery. The two tables reproduced show that phage therapy had no effect in aborting the typical clinical infection or in modifying it when established although the average stay in hospital was rather less in the phage treated group than in the control series. The authors remark that the stay in hospital was considerably greater than was found necessary among British troops nursed under British medical officers.

The percentage of isolations of the infecting organism was similar in the two series 50 per cent in the control and 55.5 per cent in the treated group. [This is a small proportion of positive results the culture medium used is not stated]. The presence of phage in the faeces did not seem to lessen the chance of isolating phage sensitive dysentery strains. Experiments on the absorption and examination of bacteriophage showed that the lytic agent persisted in the faeces for 5-6 days after administration and was detectable for a short period in both blood and urine.

An experiment was planned to test the prophylactic value of bacteriophage. All the inmates of one cage were given 10 cc. of bacteriophage on a fasting stomach on three successive mornings. Observations on sickness rates relative to the total numbers at risk were kept for four weeks before and four weeks after the course of bacteriophage. The sickness rates in three similar cages acted as control. The incidence among the control groups was 11.3% per 1000 in the first four weeks and 10.2% per 1000 in the second four weeks. In the treated group the corresponding figures were 27.5% and 19.5%. Thus there seemed to be a reduced incidence after the prophylactic course but the difference was too small to be significant. The incidence in the treated group was higher than in the control series during the same period. [This is an important and well-documented paper which should be read by anyone interested in the treatment of bacillary dysentery.]

Incidence of Diarrhoea and Clinical Dysentery in the Control and Treated Groups from 10th May 1943 to 9th July 1943 (61 days)

	Control Group	Bacteriophage Treated Group
Data averaging strength of group	4000	4000
Total number with symptoms of diarrhoea	283	341
Percentage of number at risk who developed symptoms of diarrhoea	6.16	8.52
Number of cases of clinical dysentery admitted to hospital	136	126
Percentage of number at risk who were admitted to hospital	2.96	3.1

Comparison of Control Cases and Bacteriophage Treated Cases (Clinical Dysentery)

	Control Group	Bacteriophage Treated Group
Number of cases admitted	126	124
Assessment of severity on admission		
{ Percent mild	54	83.74
{ moderate	18.25	12.90
{ severe	6.35	3.36
Average number of days of blood and mucus to disappear	9.03	9.08
Average stay in hospital (days)	19.83	16.97

Robert Cruickshank

POTH E. J. Use of Succinylsulfathiazole and Phthalylsulfathiazole as Intestinal Antiseptics. *Texas State J Med* 1943 Nov 39: 369 [Summary taken from *J Amer Med Ass* 1944 Jan 15: 124 No 3 1943]

According to Poth sulfanilol guanidine which has been used successfully in the treatment of bacillary dysentery has little antibacterial

activity when there are ulcerations in the bowel. This may explain the ineffectiveness of sulfanilylguanidine late in the disease. Succinyl sulfathiazole alters the bacterial flora and reduces the bulk of the fecal material while rendering it semifluid. For this reason it can be used in the preoperative treatment of the gastrointestinal tract. Succinyl sulfathiazole 0.25 gm per kilogram of body weight divided into six equal portions is administered at four hour intervals by mouth. Post operatively no gastric suction is used and as soon as the patients can take 30 cc of warm water and this usually occurs within twenty four hours after operation the administration of the drug similar to the preoperative regimen is reinstituted. The drug is tolerated surprisingly well. Its administration is continued for from twelve to fourteen days postoperatively. In a series of some 50 patients in whom primary sutures of the large bowel was undertaken there has been no instance of peritonitis or fecal fistula. The studies on acetylated sulfonamides as intestinal antiseptics have been extended to new compounds including phthalylsulfathiazole (sulfathalidine). This compound showed from two to four times the bacteriostatic activity of succinylsulfathiazole locally in the gastrointestinal tract as indicated by the alteration of the coliform flora. Phthalylsulfathiazole like succinylsulfathiazole is sparingly absorbed from the gastrointestinal tract and should be more effective in treating bacillary dysentery than is succinylsulfathiazole or any other of the known sulfonamides.

BEIGLBOCK W Zur Behandlung der Reiterschen Krankheit (Ruhr rheumatismus) [The Treatment of Reiter's Disease] *Deut med Woch* 1943 Nov 26 v 69 No 47/48 803-5

In the war of 1914-1918 REITER described an atypical arthritis combined with splenomegaly conjunctivitis iritis urethritis and cystitis and since that time the symptom complex has been known in Germany as Reiter's disease.

Polyarthritis enterica or dysenteric arthritis is frequently complicated by ocular and urinary manifestations especially in mild dysentery but seldom in acute *Shiga* infections. The clinical picture of Reiter's disease is characteristic—a febrile onset with effusions often of large size into certain joints especially the knee and occasionally the mandibular and sternoclavicular.

The urethritis which is complicated by cystitis and marked balanitis causes relatively little inconvenience. Externally some inflammation of the meatus can be observed. The urethritis and the conjunctivitis usually precede the polyarthritis in onset and there are often iritis and iridocyclitis as well. The blood picture shows a marked polymorphonuclear leucocytosis and the blood sedimentation rate is greatly increased. The aspirated synovial fluid is characterized by numerous polymorphonuclear leucocytes a feature which is common also to the urethral and conjunctival discharges. Neither in smears nor in culture could any micro organisms be detected. The joint fluid is light yellow in colour somewhat opalescent and of a gummy consistency with a high albumin content (2-4 per cent). Notwithstanding claims to the contrary no agglutination of dysentery emulsions by the synovial fluid was obtainable.

Some authors regard the syndrome as an allergic manifestation to dysenteric infection as in most cases the serum agglutinates Flexner (rarely *Shiga*) organisms.

In contrast to acute and gonorrhoeal polyarthritis heart complications have not been observed. The disease is intractable often restricted to one or several large joints and is irregularly resistant to drug treatment.

Because of good results obtained in gonococcal arthritis protein shock therapy with arthion was tried. After three febrile reactions the joint effusions diminished there was no further extension and the conjunctivitis and urethritis cleared up. A typical case of successful treatment by this means is cited. It is probably best to begin with 0.1 or 0.2 cc of arthion and gradually increase to the effective dose. The beneficial results of this form of treatment and the eosinophilia which is sometimes present support the hypothesis of the allergic nature of this symptom complex.

Reiter's disease appears to be nothing else than the familiar dysenteric polyarthritis with some superadded toxic manifestations which have been previously described. The splenomegaly remains unexplained.

P. Manson Bahr

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

FRANK J. R. Amoebic Abscess of Spleen. Memoranda. Brit Med J 1944 Apr 1 438

A record of a case in an Indian girl aged 12 who had been ill for a month. The spleen was greatly enlarged but the liver was normal in size. There were leucocytosis of 13,400 (neutrophils 80 per cent) and anaemia. A provisional diagnosis of amoebic peritonitis was made and emetine was given. Cysts of *E. histolytica* were found in the stools the following day and within a few days a fluctuating swelling developed over the spleen. From this 40 cc of sterile pus (similar to the pus of a liver abscess) were aspirated and 10 cc were withdrawn a few days later. No *E. histolytica* were found in the pus. The patient improved greatly in a short time.

Amoebic peritonitis is rare and is usually associated with hepatitis in this case there was no clinical evidence of liver involvement.

Charles H. Wilcocks

BOE J. The Occurrence of Human Intestinal Protozoa in Norway. *Acta Med Scandinavica* 1943 113 No 4 321-8 [24 ref.]

With a view to obtaining some idea of the incidence of intestinal protozoa in Norway the author has examined 1,111 patients in medical and surgical wards of three hospitals in Oslo. Of these patients 510 were females, 601 males. While 17% were children under 15 years of age. The majority of the patients (40 in number) had no signs of gastrointestinal disease nor any other symptoms which might be attributed to intestinal protozoal infection. The incidence of such infections in these 740 patients is taken as an indication of the incidence in healthy persons in Norway. At least 40 per cent are infected with one or more of the three common intestinal amoebae or flagellates in the following percentages:—*E. histolytica* 2.43, *E. coli* 15.6, *E. nana* 17.91, *I. buschii* 7.97, *D. fragilis* 7.70, *G. intestinalis* 5.14, *C. mesnili*

2.43 *T. hominis* 1.08 *E. hominis* 0.81 Clinical investigations could in no case establish any relationship between the symptoms and *E. histolytica* which however was fully virulent to kittens. Certain of the carriers of *E. histolytica* gave a positive complement fixation reaction when their sera were tested by Craig's technique. *Giardia intestinalis* was more frequently encountered in those with gastro-intestinal disease than in healthy persons and still more frequently in persons with symptoms attributable to gall bladder involvement but it was not possible in any one case to conclude that the flagellate was the cause of the trouble. It was impossible to demonstrate any symptoms characteristic of this infection and even less possible to draw any clinical picture of lamblasis. Nevertheless the impression was gained that this flagellate was not entirely innocuous. C. M. Wenyon

BEWS D. C. & CHOQUETTE L. P. E. A Preliminary Study of the Incidence of the Intestinal Protozoa in the Canadian Armed Forces. *Canadian Med. Ass. J.* 1943 Dec. v. 49 No. 6 501-3

Faecal specimens from 500 unselected patients belonging to one or other of the armed forces of Canada who were admitted to the Military Hospital at Ste. Anne de Bellevue, Quebec, were examined for protozoal cysts by the centrifugal floatation method. It was estimated that over 50 per cent. had some form of protozoal cyst. Though cysts of *E. histolytica* were not present, this high incidence of protozoal infections in a country where sanitation is considered to be good emphasizes the difficulties of prevention of dysenteric disorders and diseases of bad hygiene in the tropics where it may be impossible to ensure or enforce the essentials of good sanitation. C. M. Wenyon

LUBINSKY G. A. Lebensalterliche Verschiedenheiten der menschlichen Darmprotozoenfauna in Kiew. [Age Differences of Human Intestinal Protozoan Fauna in Kiev.] *Deut. Tropenmed. Ztschr.* 1943 Sept. 1. v. 47 No. 17/18 457-64 3 fig.

The paper records the results of the examination for intestinal protozoa of a single specimen from each of 1,000 inhabitants of Kiev varying in age from half a month to 82 years. Of these 70.2 per cent. harboured one or more of the protozoa. With the exception of *Giardia intestinalis* which reached its highest rate in children 2-4 years of age (57-59 per cent. infected) there was a steady increase in infections with increasing age up to 73.9-89.6 per cent. in adults. *Entamoeba coli* was present in 34.1 per cent. of the 1,000 while 4 nuclear cysts (*E. histolytica*) were found in 17 per cent. C. M. Wenyon

DREYFUSS F. Giardiasis. *Harefuah*, Jerusalem 1944 Feb. 1. v. 26 No. 3. [In Hebrew 45-7 (10 refs.) English summary 47.]

After a few remarks on the epidemiology and morphology of *Giardia intestinalis*, the parasites' localization in the organs of the patient and signs and symptoms in infected persons are discussed. A short account of our experience with this parasitic infestation is given. The frequency of hypochlorhydria or achylia in cases of giardiasis as observed in our cases has been stressed. Diagnosis is shortly explained. With reference to the pertaining literature the pathogenicity of the parasite is discussed. *Giardia intestinalis* is in our opinion conforming

with that of most recent authors to be regarded as pathogenic for all practical purposes at least when the infestation assumes certain proportions. In consequence we advise in every case the removal of the parasite. Since Galli Valerios and Brumpt's discovery of the specific treatment of this condition by atabrin all the various methods previously used have become obsolete being definitely less effective than atabrin. It has proved also in our hands as a most active parasiticide. Some details about this treatment are given. Several case histories illustrate the clinical features and treatment of the condition. It is emphasized that the finding of giardia in a given case should not induce the physician to overlook other pathologic conditions. Finally the importance of a thorough parasitological examination is stressed especially but not only in abdominal diseases which may frequently disprove the presumptive diagnosis of a functional condition and so make it amenable to specific chemotherapeutic treatment.

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

CHOVINE V & COERGUE O. Culture des spirochetes sanguicoles de l'homme. [The Culture of Human Blood Spirochaetes.] *Bull Soc Path Ex* 1943 Oct 13 v 36 No 9-10 262-74 4 graphs on 2 p. [No refs.]

A general account of the various media which have been used for the culture of human relapsing fever spirochaetes and the authors' experience in the growth of three strains of *Spirochaeta hispanica* Sabin, *S. citricarpa* S. ducloux and *S. laticarpa*.

Two media were used with the following composition:—

Medium No. 1—Water 100 gm. of peptone and 70 gm. of NaCl per litre adjusted to pH 7.5 filtered and sterilized in the autoclave	150 ml.
Unbated fresh rabbit serum	30
Medium No. 2—Tyrode's solution pH 7.5—4	100 ml.
Unbated fresh rabbit serum	50
10 per cent. peptone water that is ultrafiltered sterilized at 120°C	10

The media are placed in tubes 8 mm. in diameter and 15 cm. long. Sterility is tested by incubating the tubes for 24 hours at 37°C. the medium is then covered with a layer of paraffin 1 cm. thick and the tubes again incubated for 24 hours. The media retain their properties for about 6 months kept in the ice chest but the authors advise the use of fresh media when isolating strains.

Before these culture media are inoculated with spirochaetes it is necessary to add a small quantity of either defibrinated blood or laked blood. The latter has certain advantages since it can be passed through a Chamberland filter L2 or L3 before use but unless a very fresh medium is used human blood spirochaetes develop better in the presence of defibrinated whole blood.

During the isolation of culture strains the 2nd to the 8th passages are found to be the critical stages when fresh media should be used. The optimum temperature for growth is 25 to 30°C. The pH rises to 8.2 to 8.3 in the stored media but the growth of spirochaetes produces an acidification which is more rapid in Medium No. 1 than in No. 2.

The strains of spirochaetes tested grew better in Medium No 1 with the exception of *S. turicatae* which required a more buffered medium such as No 2. *S. turicatae* has a marked acidifying action on the medium whilst *S. hispanica*, *S. babylonensis* and *S. recurrentis* produce alkali. Spirochaetes are very susceptible to any fall in pH hence the necessity for a buffered medium in the case of the former.

It is necessary to use blood containing numerous spirochaetes for the original inoculation and it takes 7 or 8 passages for the organisms to become adapted to the culture media. When the medium is favourable spirochaetes are always numerous and subcultures are successful. The virulence of the organisms is well maintained in cultures and falls off only very slowly.

E. Hundle

STEIN G. J. The Serological Diagnosis of Relapsing Fever. *J. Exper. Med.* 1944 Jan 1 v 79 No 1 115-28 [21 refs.]

A description of methods on the differential diagnosis of relapsing fever based on the use of saponin treated spirochaetes as antigens.

The author obtained suspensions of spirochaetes from the blood of rats or mice infected either with *Spirochaeta recurrentis* or *S. hermsi*. The heavily infected blood was laked by means of saponin and then centrifuged at 2 500 r.p.m. for 45 minutes. The sediment was washed four times in physiological saline using the same speed. The last suspension was then centrifuged at 1 300 r.p.m. for 30 seconds to remove any large particles and the resulting fluid diluted until it showed a certain turbidity (MacFarland's No 5 tube). This fluid contained at least 80 spirochaetes per oil immersion field and was used as the antigen in serological studies.

Various sera were examined for antibodies by agglutination and complement fixation tests. They included the sera of rats, mice and guinea pigs infected with various strains of relapsing fever and also assorted heterologous and normal sera.

Spirochaetes obtained in this manner appear to have wide antigenic specificity and fixed complement in the presence of serum obtained from animals infected with six strains or species of relapsing fever including *S. duttoni*, *S. kochii*, *S. novyi*, *S. recurrentis*, *S. hermsi* and *S. turicatae*.

Tests were also carried out with serum from three human cases of relapsing fever. One of these patients had been infected with *S. novyi* 36 years previously and gave slight positive reactions. The other two were infected therapeutically with *S. hermsi* and tested both before and after infection. The agglutination titre rose to 1-500 in one patient and 1-100 in the other and specific antibodies were present in both acute phase and convalescent sera. Macroscopic agglutination of the spirochaetes was also observed with these sera.

Various other convalescent sera were tested including those of typhus fever, malaria, Rocky Mountain spotted fever, Weil's disease, syphilis and typhoid fever. These and also hyperimmune serum prepared against other pathogens failed to react with the relapsing fever antigens.

No apparent change in the antigens occurred after storage in the ice-box for at least four months and the results indicate that spirochaetal suspensions prepared in this way yield a relatively stable antigen which will be of use in the serological diagnosis of relapsing fever.

E. Hundle

GLUCK G Besondere Verlaufsformen bei nordafrikanischem Rückfallfieber [Special Features of North African Relapsing Fever] *Deut med Woch* 1943 Sept 17 v 69 No 37/38 653-5

The author has seen two cases of North African relapsing fever with meningo-encephalitic symptoms and gives a detailed clinical history of the second case. This patient a 26-year old army officer developed rheumatic symptoms and a few days later showed slight jaundice and enlargement of the liver. A diagnosis of hepatitis was made but 11 days after the beginning of the symptoms the patient had a febrile attack which lasted three days and relapsing fever spirochaetes were found in the blood. An injection of neosalvarsan was followed by a negative period of 16 days and then a relapse during which the patient developed marked symptoms of meningo-encephalitis which lasted for about five weeks. Mice inoculated with cerebrospinal fluid collected during this attack showed spirochaetes in their blood. During the following month there were slight evening temperatures and various headaches. A second febrile attack developed 54 days after the first injection of neosalvarsan and spirochaetes again appeared in the blood. The patient was cured by 3 further injections of neosalvarsan each of 0.6 gm at three-day intervals.

The author discusses the differences between the European and North African relapsing fevers with special reference to the neurotropic properties of the latter and for treatment recommends the use of at least four injections of neosalvarsan at three-day intervals.

E Hundle

PIFANO F Investigaciones para el estudio de la fiebre recurrente en Venezuela [Relapsing Fever in Venezuela] *Rev Sanidad y Asistencia Social* Caracas 1941 Dec v 6 No 6 87-811
4 figs [14 refs]

This is a detailed account of a well-devised and carefully performed investigation. It was planned in 1940 by the National Institute of Hygiene and envisaged work on epidemiological, clinical and parasitological aspects and on measures of control. Programmes of work in the field and in the laboratory were drawn up. The former included a study of the zones of prevalence of the disease, collection of arthropods, examination of possible reservoir hosts of the blood of persons in contact with patients to find out if healthy carriers existed, also the prevalence, age and sex of patients and possible sources of infection and a clinical study of cases. The laboratory programme included a biological and bionomical study of *Ornithodoros venezuelensis* determined on of its food supply by precipitin tests, its infectivity for animals, cultivation of the spirochaete and so on.

It was found that all ages were attacked but children more than adults, the reason for the disease being usually milder in adults is probably that a certain degree of immunity is acquired in childhood. Ticks in Venezuela are many *Amblyomma haemaphysalis* *Ornithodoros* *Ixodes rhipicephalus* and *Boophilus* but only *O. venezuelensis* transmits *S. venezuelensis*. It has a restricted range in the Andes affecting in particular Mérida and Tachira. In Yacuy occurs a species closely allied to *O. venezuelensis*. The habits of this tick resemble those of the bed bug. It hides during the day in cracks in the wood of the bed or in the bed-clothes and emerges at night to feed. No reservoir

host was found dogs cats pigs pigeons fowls all were negative. Man seems to be the only host. An opossum *Didelphys aurita* harboured a spirochaete morphologically indistinguishable from *Sp. venezuelensis* but its identity with *Sp. venezuelensis* was not confirmed biologically.

Clinically the disease can be divided into three stages. The period of invasion (after an incubation of 7-15 days) with shivering intense headache backache and general pains in muscles and joints fever 39-40 C with nausea vomiting and at times diarrhoea. The eyes are congested and skin dry. The second stage is characterized by jaundice and haemorrhages usually about the third day [but in another place the author states that bleeding is rare in Venezuelan relapsing fever when it does occur it usually takes the form of epistaxis or bleeding from the gums]. The third stage is marked by renal symptoms albuminuria oliguria or even anuria. In one case meningitic symptoms were observed rigidity of the neck Kernig's sign bradycardia and delirium and the cerebrospinal fluid was under increased pressure. Spirochaetes were found in the blood and the symptoms cleared up on specific treatment being instituted. The remission between attacks was from five to twelve days. Often the disease was cured or attacks ceased after the first relapse if others followed they were progressively milder and occurred at longer intervals. The disease generally is of a mild type and up to the present no fatality has been recorded. [This was in 1941.]

Laboratory studies showed that the ticks had no spirochaetes in their salivary glands or intestine but when present they were in the coxal fluid or in the tarsal lymph and it is thought that infection arises from these fluids by way of the wounds made by the bites or by scratching. Precipitin tests revealed no other food than human blood in these ticks but rats and mice could be infected by subcutaneous injection or by ocular instillation of macerated infected ticks in saline. The incubation period was usually 4-6 days. After another 5-7 days the spirochaetes diminished and then could not be found at all until a relapse occurred—just as in man. The brains of mice infected six months previously with *Sp. venezuelensis* were infective although their peripheral blood was not. The spirochaete was cultivable in Li Yuan Po's medium and in Moroder's horse serum [see this *Bulletin* 1930 v 27 113]. It grew well also in chicken embryo.

H. Harold Scott

HOAGLAND R. J. HARPIS F. H. & CHINEV S. S. Leptospirosis (Weil's Disease). *Hawai Med J* 1943 Jan-Feb v 2 No 3 131-6 [13 refs.]

A general account of the disease in which the authors stress the likelihood of it being encountered by medical officers in the military service especially in the Territory of Hawaii.

It should be suspected when jaundice fever severe muscle pain and tenderness conjunctivitis and haemorrhagic manifestations are present. Jaundice however is absent in 35 to 50 per cent of the cases. Typically there is a leucocytosis of 10 000 to 30 000 cells per cmm of blood with a relative increase of neutrophils accelerated red cell sedimentation rate hyperazotaemia and hypercholelaemia.

During the first week of illness leptospirae may be isolated from the patient's blood by inoculation into culture media or into young guinea pigs. During the third week of illness the organisms may be similarly

isolated from the urine. Agglutination tests give positive results after the first week of illness with titres frequently over 1:10,000. Agglutination in dilutions of 1:300 is diagnostic if a rising titre is observed. The microscopic examination of urine sediment stained by Fontana's method is likely to show leptospirae during the third and fourth weeks of illness.

The clinical manifestations of leptospirosis, yellow fever and relapsing fever are similar but the course of the fever is somewhat different in the two diseases. The clinical distinction between leptospirosis and relapsing fever is also very difficult but in the latter spirochaetes can usually be found in the blood during the febrile attacks.

Finally the authors give details of a typical case of Weil's disease in an aplethemic man. In Haemorrhagic Leptospirosis are isolated from both the blood and urine of this patient.

E Hindle

ALICATA J. E. & BREAKS, Virginia. A Survey of Leptospirosis in Honolulu. *Haem. Med. J.* 1943 Jan-Feb, 2 No 3 137-42
11 refs.]

Leptospirosis has been of medical interest in the Hawaiian Islands practically since 1936 when the causative organism was first isolated from a human case and the present survey was undertaken on behalf of the Public Health Committee of the Chamber of Commerce of Honolulu to determine the extent of the infection in man and animals.

During the six years from 1936 to 1942 82 cases of the disease have been reported as follows:—Hawaii 59, Kanae 4, Lanai 14, Maui 1 and Oahu 4. Agglutination tests were carried out with the sera of 344 adult persons residing in Honolulu using freshly formalized *Leptospira icterohaemorrhagiae* and *L. canicola* antigens. Of these six sera agglutinated the former to a titre of 1:300 or more and six to a titre of 1:100. One serum agglutinated *L. canicola* to a titre of 1:300.

Similar tests carried out with sera of 100 dogs gave 20 positive for *L. icterohaemorrhagiae* and 19 for *L. canicola*. The sera of 100 cats were uniformly negative.

The kidneys of 350 rats trapped in seven districts of Honolulu were examined microscopically by means of silver stained sections and 10 showed leptospirae. The kidney sections of 8 out of 97 rats trapped along the banks of three fresh water streams were also positive. The rats belonged to four species: *Icthiomys morio*, *Rattus alexandrinus*, *Rattus rattus* and *Rattus norvegicus* but the infection was found only in the first two species. The kidneys of 12 mongooses trapped along one of the streams were also examined and four found to be infected. This suggests that the mongoose may be of importance in the spread of the disease in nature. It probably becomes infected as a result of eating rats and/or cats.

A human strain of *L. icterohaemorrhagiae* was isolated by inoculating the urine of the patient into young guinea pigs and then culturing pieces of infected kidney and liver of these animals in Verwoort's medium. A rodent strain was obtained by the same method using kidney emulsions from infected rats. A strain of *L. canicola* was isolated from the kidneys of two infected dogs which had died from the disease. Finally the authors discuss methods of controlling the disease, the most important being rat control and the protection of human beings and dogs from exposure to infection.

E Hindle

LEPROSY

COCHRANE R G The Epidemiology Pathology and Diagnosis of Child Leprosy (being the Dr Elizabeth Mathai Endowment Lectures 1942-43 delivered at the Medical College University of Madras) 24 pp 1 chart [40 refs] 1943 Madras Govt Press

This lecture includes an account of previously published work much of which was dealt with in this *Bulletin* 1944 v 41 47 In addition to the data in that paper illustrating the conditions under which the infection of children with leprosy most commonly arises emphasis is laid on the frequency with which early and limited neural lesions undergo spontaneous recovery in children The pathology of child leprosy is also dealt with and it is suggested that lepra bacilli like the kindred tubercle bacilli may remain latent for years after gaining access to children and active symptoms and lesions only develop years after when for some reason the conditions become favourable for the multiplication of the organisms in the tissues The diagnosis is discussed on the usual lines and detailed descriptions are given of the early dermal lesions which will be of service to those with little clinical experience who should read the paper in full *L Rogers*

FRAZIER C N Leprosy Epidemiology and Natural History *J Amer Med Ass* 1943 Oct 23 v 123 No 8 466-8 [16 refs]

This is a very general account of the epidemiology of leprosy The author points out that on account of failures to cultivate the leprosy bacillus very little exact information is available on the mode of infection He suggests that Stefansky's rat leprosy bacillus may perhaps be identical with that of the human disease and infection derived from rats although he quotes data to show a lack of relationship between rat distribution and the human disease He agrees that long and close contact with human cases results in infections His own experience of the disease was at Peiping China where during twenty years he saw only one case of leprosy which had definitely been contracted in that province which is situated at approximately 40 degrees north latitude Owing to the variable course of leprosy he was not convinced of the curative value of hydnocarpus preparations *L Rogers*

FERNÁNDEZ VAUTREI R La lepra en Tovar (Estado Aragua) [Leprosy in Tovar Aragua State] *Rev Sanidad y Asistencia Social* Caracas 1943 Aug v 8 No 4 681-710 13 graphs

This is a full account of a very detailed investigation in a very small locality The municipality of Tovar was formed in 1942 Its area is about 35 sq kilometres with a population of 821 at the last census distributed in 136 dwellings Their degree of culture is low few are able to read or write their ideas of sanitation are deplorable Though they clothe themselves in finery they never bath the houses are well constructed of wood and brick but incommodious Parents sleep in one room the children in another but often there is general promiscuity

Mo: A M Relacion entre la accion difusora de la piel lepromatosa
 contenido en bacilos de Hansen (Comunicacion preliminar)
 Relation between the Reynals Factor and the Bacillary Content of
 the Leprous Skin Re: Argentina de Dermatofilologia 1943
 Dec / No 4 49-58 2 fig & 1 graph [16 refs] English
 summary

The Reynals Factor spreading factor diffusion factor] is the term given to the substance present in extracts of animal tissues which increases the rate of diffusion in the skin of bacteria and vital stains. It was first described by DURAN REYNALS in 1928. This factor as applied in 1934 by THOMAS and DURAN REYNALS to the area of reaction of tuberculinized guinea pigs to tuberculin when they showed that the reaction area was more extensive but less in intensity than in controls. The Reynals factor present in skin but testicular extract is particularly rich in it.

Diffusion of extracts of normal skin was about one-half of that of testicular extract with extract of skin of tuberculous leprosy it was slightly higher than with normal skin with extract of skin from lepromatous guinea pigs diffusion was only equal to that of normal saline. Thus it was supposed that diffusion was due to the greater numbers of bacilli in lepromatous skin which apparently inhibited the spreading factor. The present work was to test the hypothesis that the inhibitory effect on diffusion was due to *Mycobacterium leprae* and as a corollary that the diffusibility of extract of the lepromatous skin is inversely proportional to its richness in bacilli.

To test the former the author injected the depilated skin of the flanks of four rabbits with (a) 0.2 cc of whole lepromin plus 0.1 cc of 1 per cent trypan blue (b) 0.2 cc of bacillary lepromin plus the trypan blue (c) 1 cc control 0.2 cc of physiological saline plus the trypan blue. The whole lepromin was obtained by boiling and pouring phenol bacillary lepromin is a suspension of Hansen's bacilli prepared by the Fernandez technique see thus *Bulletin* 1947 v 39 227. The extent of diffusion as measured every half hour at first then at 5, 10 and 4 hours. Eighteen 30 minutes it was clear that with whole lepromin the diffusion was much greater than with bacillary lepromin. In fact five times as great while that of bacillary lepromin was no greater and was less than the saline control.

To test the second point the relation of the diffusibility to the richness in bacilli from one to another portions of skin were taken from a patient with many designated L_1 , L_2 and L_3 . These were triturated with 20 volumes of Ringer's solution with sand and 0.2 cc of each extract was injected and centrifuged at 4000 r.p.m. and 0.1 cc of each extract was injected with 0.1 cc of 1 per cent trypan blue into the depilated skin of white rabbits and the diffusion of the stain noted as before. The results are shown in diagrams. The diffusibility of the lepromatous skin extract was found to vary inversely as the bacillary content. Hence comparison in the diffusion of the anti-leprosy used for standard and bacillary lepromin intradermal reactions the latter (pure suspension of bacilli) acts like a lepromatous skin rich in bacilli. The apparently paradoxical result that whole lepromin diffused well while the extract of skin containing many leprosy bacilli (L_2) diffused much less is difficult to explain. It might be argued that the greater dilution and phenol content of the

former checked the inhibitory action of the leprosy bacilli on the diffusion factor but the bacillary lepromin was equally dilute and contained phenol yet its diffusion was slight. Possibly another condition intervened the skin extract probably contained living bacilli while the bacilli in whole lepromin had been killed. Pending further experiments conclusions must be provisional. [For work by DURAN REYNALDS on spreading factor in snake venoms see this *Bulletin* 1939 v 36 563 807] *H Harold Scott*

FAGET G H & MAYORAL A Bone Changes in Leprosy a Clinical and Roentgenologic Study of 505 Cases *Radiology* 1944 Jan v 42 No 1 1-13 20 figs

This is an important and well illustrated paper based on a large amount of material at the Carville Leprosarium Louisiana U.S.A. It is based upon a study of 505 cases of all types.

TABLE 1—Incidence of bone and muscle changes in leprosy

Types of Disease	Number of Cases	X ray Bone Changes	Muscular Atrophy and Contracted Digits
Mixed type	241	79	66
Lepromatous type	160	9	0
Neural type	92	59	26
Tuberculoid type	12	0	1
Total	505	147	93

The incidence of X ray changes in the different types of the disease in relation to the presence of muscular atrophy and contracted digits is shown in Table I. The ages of the patients varied between four and 76 years the majority were between 20 and 45. In neural leprosy there were bone changes in 64 per cent in mixed leprosy in 33 per cent and in lepromatous disease in only 5.6 per cent. More or less muscular atrophy and digital contraction were met with in 92 of the 333 mixed and neural cases this amounted in some to typical claw hands and feet. The authors noted that although the majority of these had both neurotrophic and motor disabilities many showed either bone absorption or muscular paralysis and contracture alone. They have not hitherto seen reports of this exclusive involvement of either the motor or the neurotrophic fibres in leprosy. Further bone absorption is most marked when atrophy and contracture are inconsiderable and the reverse is also true.

In neural leprosy the bone changes are not due to the direct action of Hansen's bacillus but are secondary to neurotrophic lesions. Spontaneous absorption of bone thins out or shortens the phalanges metatarsals and metacarpals. It generally starts in the distal phalanges and causes slicing and nicking of the tufts [tuberosities of the heads] then a shortening of collar button type followed by gradual disappearance. The bones seem to melt away the proximal phalanges being the last to disappear occasionally the metacarpals are also attacked. In the feet the absorptive process is more likely to start in the shafts of

the proximal phalanges or in the heads of the metatarsals. Rarefying osteitis produces a gradual thinning of the phalanges until only a fine needle of bone is left—a process of concentric bone atrophy during which the medullary cavity disappears or becomes calcified. Complete disappearance of the bone may eventually so that the toes are loosely connected to the foot by soft tissues. Trauma is a contributing factor for end of the finger and the weight bearing ball of the foot where the most pressure are most affected. Subluxations result from affluxion of the small joints they are not entirely absent from larger ones for the authors have met with five cases showing typical Charcot's joints of wrists and ankles. Long standing leprosy neuritis resulting in disturbance of the nutritional functions of the affected nerves is the main cause of bone absorption. It does not occur in purely cutaneous or lepromatous types. From their study of arteriograms the authors think that the arterial circulation of the extremities is not materially disturbed in neural leprosy in isolated and mixed cases on the other hand localized arterial defects and decrease in size of arterial branches were found suggesting the leprosy endarteritis (illustrated) described by FITE (this Bulletin 1942 v 39 223). Secondary bacterial infections play a part in the process.

The bone changes described in lepromatous cases are of special interest. No cases are free from them even in the most advanced stages. In the nine cases in which they were found they consisted in enlargement of the nutritive canals of the phalanges in four cyst formation which revealed the presence of lepra bacilli on being aspirated in three necrosis or osteomyelitis in one and periostitis in one. The enlargement of the nutritive canal is believed to result from leprosy endarteritis already mentioned. The bone cysts (illustrated by X ray photographs) are attributed to the direct action of Hansen's bacillus in infecting the medullary cavity.

L. Rogers

COONEY J. P. & CROSS E. H. Absorptive Bone Changes in Leprosy. *Radiology* 1944 Jan v 42 No 1 14-19 6 nos (13 refs)

This short paper reports the author's experience at the Palo Seco Leprosarium in the Panama Canal Zone. It discusses the phenomenon of complete bone absorption of the small bones of the hands and feet of lepers associated with loss of sensation and muscular power due to sensory and motor nerve lesion together with neuro-circulatory changes leading to ulceration at the sites of pressure. The authors have seen cases with marked destruction of the metatarsal and tarsal bones but with preservation of the phalanges intact. Very strong pulsation of the large arteries of the wrists and ankles indicated good circulation associated with early enlargement of the nutritive foramina of the affected bones. A close study of fifteen cases has led them to attribute the observed bone absorption to the combined action of disturbance of circulation, anaesthesia and pressure.

L. Rogers

DHARMENDRA. Immunological Skin Tests in Leprosy. Part IV. The Isolation of Three Different Protein Fractions from *Mycobacterium leprae*. *Indian J Med Res* 1943 Oct v 31 No 2 125-7

In Part I of this series of papers the author recorded having isolated a protein antigen from *M. leprae* which alone was definitely antigenic (this Bulletin 1942 v 39 225). By further work on the extraction of

ground bacilli with weak acid weak alkali and 80 per cent alcohol respectively three different proteins were isolated. The antigenic activity of these fractions is considered in the present paper. It was hoped that one would be found specific for *Mycobacterium leprae* and would give negative results in the vast majority of non contacts such as people living in Punjab villages without any leprosy cases. This hope has not been fulfilled but the incidence of positive reactions on intra dermal injection of the different protein fractions was 75 per cent with nucleo protein (extracted with alkali and phosphate buffer at pH 6.5) 60 per cent with acid soluble and only 30 per cent with alcohol soluble protein. The incidence of positive results in non contacts has thus been markedly reduced and it is hoped that further work may yield a specific antigen.

I Rogers

DHARMENDRA Immunological Skin Tests in Leprosy Part V A Bacillary Antigen Standardized by Weight *Indian J Med Res* 1943 Oct v 31 No 2 129-32

In view of the failure recorded in the foregoing paper to isolate a specific protein fraction of *Mycobacterium leprae* further studies have been made of more simply obtained standardized antigens from the whole bacilli starting with partly defatted bacilli which produce both early and late reactions in neural leprosy cases. The bacilli are obtained by extracting leprous nodules with chloroform storing for four days in a refrigerator evaporating and suspending the residue in ether and centrifuging the ethereal suspension in a refrigerator. For standardization 1 mgm of the powder is suspended in 10 cc of 0.5 per cent carbolic saline and 0.1 cc of this suspension is used for the test. It produces both early and late reactions the early ones are the stronger in neural cases but there were no reactions in lepromatous cases. This antigen is considered to retain most of the advantages of the protein fraction of the bacilli and to be easy to prepare. With the chloroform method the yield of bacilli is three times as great and weight for weight it is more potent than the one obtained by centrifuging a suspension in water of leprous tissue at different densities.

L Rogers

WINDSOR McLEAN L. A. The Kline Reaction of Nauruan Lepers and Non Lepers *Med J Australia* 1943 Dec 25 v 2 No 26 520-22

The responses to the Kline test of 52 leprous Nauruans and 45 non leprous Nauruans have been investigated.

There is no statistically significant difference between the groups. Therefore this investigation has produced no evidence that active leprosy tends to produce a positive reaction to the Kline test.

PARDO CASTELLO V. & TIAN F. R. La prueba de histamina. Con particular referencia al diagnostico de la lepra. [The Histamine Test in the Diagnosis of Leprosy] *Rev Leprologia Dermatologia y Sifilografia* Marianao Cuba 1944 Jan v 1 No 1 19-23 1 fig

The so called triple reaction of Lewis when histamine 1/1 000 is injected intradermally comprises a purpuric spot at the site of inoculation with an erythema of several centimetres in diameter in the centre of which a weal forms. It is said to be due to direct neurovascular stimulation and a normal reaction implies integrity of the sensory

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fibres of the peripheral nerves. The test is useful therefore in determining nerve degeneration after injury in differentiating hysterical from organic anaesthesia or from true it is also an aid in localizing spinal lesions and in distinguishing nerve-root lesions from those of the spinal medulla.

The detail of procedure in a suspected case of leprosy are as follows: A drop of 1:1000 phosphate of histamine is placed on the suspect area a second at the junction of the 7th normal skin and a third on a normal skin and a puncture not enough to draw blood is made with a hypodermic needle through each. In the case of the normal skin in 25-45 seconds an erythema arises from 3-5 cm. in diameter in the centre of 68-100 seconds a weal 2-3 mm in diameter appears as long as the erythematous area and in three minutes or so (occasionally as long as 45 minutes) these signs fade. In a leprosy part of the skin the weal appears but the erythema does not so that at the site of the normal and affected parts meet. The authors prefer the puncture to the scarification method the think it gives more precise results.

With saline or distilled water there is a slight reddening with a minute weal which rapidly passes off. The authors have made the test on some 300 lepers in Havana and on 50 controls suffering from non-leprosy skin condition. The authors have made the anaesthetization with procaine and in a case of polyneuritis of ten years duration with muscular atrophy the reaction was normal also after local delayed also in a case of polyneuritis due to avitaminosis B₁ in another with tabes dorsalis and a patient with generalized scleroderma. The authors have not yet had an opportunity of making the test on a patient with syringomyelia but SCHUMMAN in 1939 did so and reported that the reaction was normal see this Bulletin 1940 37:337 where other references are given.

H. Harold Scott

GAY PRIETO J. Sobre la curabilidad de la lepra. Curación clínica y bacteriológica espontánea de un enfermo con lepra incipiente. *The Curability of Leprosy* Spontaneous Cure of an Early Case] *Med. Coloral* Madrid. 1944 Feb 1 3: 60-71-7

An interesting and unusual case. In May 1936 a young man of 22 years living in Torrepoyo one of the chief foci of leprosy in the Province of Jaen Spain consulted the author. His father had died with numerous leprotic lesions two years before and this man had lived with his father until the latter's death. The man himself had macular patches on forearms thighs and trunk. The man himself had edges and anaesthetic so that portions could be taken for biopsy without his feeling any pain. There were no signs in the face and no acid fast bacilli in the nasal secretion but the biopsy specimens revealed abundant globi of Hansen's bacilli. He was classified as leprosy CINI. He was ordered injections of Antileprol for six months and was told to return again then. In November 1943 that is 7½ years later he returned stating that owing to the Civil War and for other reasons he had had only 12 injections and these irregularly and he wanted to know if he might marry. The place whence the fragment had been taken for biopsy and small patches the size of a 5-peseta piece were anal esic in two places on the forearm and the thigh. Sensation to touch was normal and

that to heat slightly altered—he could distinguish heat from cold only when the differences of temperature were considerable. No bacilli could be found in the nasal mucus nor in fresh biopsy specimens and the Rubino reaction which had been positive at the first examination was now quite negative. It would seem that the man had been cured and that almost spontaneously for the amount of treatment he had received was negligible. He is however to present himself periodically for examination.

H. Harold Scott

DAVEY T F & ROSS C. An Investigation of the Effects of Cocoyam on Leprosy. *Leprosy Review* 1944 Jan v 15 No 1 3-12

The suggestion of the late OBERDORFFER that a diet rich in coco yam (colocasia) may predispose to leprosy infection has already been shown by LOWE and CHATTERJI [this *Bulletin* 1939 v 36 1015] to be contrary to the facts as regards India. This paper shows the same for Nigeria in connexion with which country the hypothesis was first put forward. The present workers fed a group of leprosy children in Nigeria with massive doses of coco yam for a year the cases being selected for low resistance to the disease and so most suitable for bringing out any toxic action of the yams. Yet no deleterious effects whatever could be observed. A study of the seasonal variations in the appearances of leprosy in relation to diet led to the conclusion that any slight toxic action of the sapotoxin in yams is not specific and at the most is only one among many factors predisposing to infection with leprosy in Nigeria.

L. Rogers

IGNACIO CHALA J & LLERAS RESTREPO F. Toxide de la difteria en el tratamiento de la lepra [Diphtheria Toxoid in the Treatment of Leprosy]. *Rev Facul de Med* Bogota 1943 Sept v 12 No 3 125-45 4 pls [18 refs] English summary

Twenty four selected cases of leprosy in the service of the Instituto Federico Lleras Acosta were treated with diphtheria toxoid. As a result of these treatments the duration of which varied between four and twenty six months we were unable to obtain any clinical improvements or modifications in the bacterial fauna. We also gave diphtheria anatoxin to patients with positive lepra reactions but without any favorable therapeutical result.

From these observations we concluded that diphtheria toxoid had no value in the therapy of leprosy. On the other hand we felt that its use might be dangerous in certain cases.

Diphtheria anatoxin and toxoid mixed in various culture media did not retard the normal growth of acid fast bacilli isolated from cases of leprosy.

GARCIA BARRIGA H. Los vegetales en la terapeutica del Mal de Hansen [Plant Products in the Treatment of Leprosy]. *Rev Facul de Med* Bogotá 1943 Oct v 12 No 4 190-205

MONEY T D F. Abstract of Administrative Reports on the Oji River Leper Settlement and Clinics for the Years 1941 and 1942. *Leprosy Review* 1944 Jan v 15 No 1 15-18

Reports for 1941 and 1942 on the Oji River Leper Settlement Nigeria show a great development of the work during the last five

years. The object of the settlement is to provide treatment to as many patients as possible and about three-fifths of the worst affected areas of the Onitsha province are now within reach of the clinics that have been established around the headquarter leper colony. An African staff has been trained to assist in carrying out treatment, laboratory work, keeping records and in nursing the serious cases and much educative work has been done to enlist the support of public opinion. The records of patients now number over 14 000. Oral treatment with hydnocarpus oil is continued in patients whose disease has ceased to be active as the result of parenteral treatment on account of the large number to be dealt with. The great majority of the patients in the Settlement support themselves on their own farms and contribute a portion of their time in unpaid work in the settlement, this greatly reducing expenses which amount to only £2 444 a year contributed by the Native administration, B. E. L. R. A. and the Church Missionary Society. Statistics of the work done are given but no clinical details or results of treatment are included. *L. Rogers*

DHARMENDRA & BOE R. Bactericidal Action *in vitro* of Sulphanilamide and Sulphapyridine on *Mycobacterium leprae muris*. *Indian J. Med. Res.* 1943 Oct. v. 31 No. 2 133-6

The action *in vitro* of sulphapyridine and of sulphanilamide on suspensions of Steffansky's bacillus in leprosy lesions of rats during 48 hours at a temperature of 37°C. and for 96 hours at 4°C. has been tested by injecting the material so treated into rats. Control experiments with similar treated suspension without the addition of the drugs produced generalized rat leprosy in those which survived for four months or more but the addition of 1:1000 of either drug at 37°C. and of sulphapyridine in a dilution of 1-10 000 prohibited the development of the disease. The results with sulphanilamide in a dilution of 1-10 000 at 37°C. were inconclusive owing to early death of the injected animals. The suspension were not free from microorganisms other than that of rat leprosy. On the other hand in suspensions kept at 4°C. the drugs failed to prohibit the infective action of the rat leprosy organisms. Five per cent sulphuric acid subsequently neutralized with caustic soda before injection also failed to kill rat leprosy bacilli.

J. Rogers

PRUDHOMME R. O. Acide ascorbique et lepre murine [Ascorbic Acid and Rat Leprosy]. *Ann. Inst. Pasteur* 1943 July-Aug. v. 69 Nos. 1-8 215-18

This note records an experiment in which 10 rats were infected with rat leprosy. Five of them were given a month afterwards injections of 0.03 gm. of ascorbic acid every three days over a period of 45 days repeated two months later up to a total of 30 injections. The experiment was based on previous analysis of the number of milligrammes of ascorbic acid found in the organs and lepromata of leprosy infected rats next to the suprarenal the largest amount was in the lepromatous tissues. Autopsies on the infected rats at different intervals showed that after four to five months the local lepromata at the sites of infection were considerably larger in the five rats which had received the injections of ascorbic acid than in the control animals. This they attribute to increased cellular reaction at the sites of infection in those animals.

receiving the injections of vitamin C. On the other hand little difference was found in the generalization of the infection or in the number of rat leprosy bacilli in the internal organs in treated and in the control rats respectively.

L. Rogers

HELMINTHIASIS

PIFANO C. F. & MAYFR M. Sobre el comportamiento de la reaccion de Fairley en los estadios clinicos de la Schistosomiasis mansoni [On the Behaviour of the Fairley Reaction in the Clinical Stages of Schistosomiasis mansoni] *Rev. Sanidad y Asistencia Social* Caracas 1942 June v 7 No 3 379-96 2 charts

In a previous paper [*Rev. de San y Asist. Soc.* 1941 v 6 290-295] the authors gave an account of their first series of experiments on this question and their methods of making the antigen used. They also there gave a summary of earlier work some of which is also here summarized. The antigens used in the work here described were the same as those used for the first experiments namely alcoholic extracts of the hepatopancreas of *Planorbis* (*Australorbis*) *glabratus* [see BRUMPT this *Bulletin* 1942 v 39 866 for the correct name of this species] which had been naturally infested with *Schistosoma mansoni*. They also used alcoholic extracts of the hepatopancreas of the same snail infested with other species of cercariae and with normal hepatopancreas. A later paper will deal with a comparative study of these antigens. Special attention was given to the use as antigens of cercariae not of the genus *Schistosoma* which are found in the snail intermediate hosts of *Schistosoma* in Venezuela: the results of this work will be published later.

Two techniques were employed. The first was a complement fixation reaction similar to Fairley's with heated inactivated serum. The second technique was a reaction with fresh sera done by Rubinstein's variation of the method of Hecht. Both methods are described in detail.

Describing the extensive work of FAIRLEY, MACKIE and JASUDUSAN [this *Bulletin* 1931 v 28 196] on infestations of goats with *S. spindale* the authors point out that very little has been done with the Fairley reaction in the different stages of human infestations with *S. mansoni*. They have studied it during the period of invasion, the period when the disease is established and the terminal period of cirrhosis. Controls were done with patients suspected of bilharziasis, with healthy persons and with patients suffering from other diseases. The reaction in the period of invasion could be studied in only three cases, details of which are given. In all three cases the entry of cercariae from infested waters could be proved and the eggs were found in the faeces. Symptoms of the toxæmic type predominated as happens when the cercarial infestation is massive. It was found that the antibodies appear at the beginning of the third week after contact with infested water: the more intense the infestation the earlier they appeared. In the period when the disease was established antibodies were found in 97.3 per cent of cases which were proved parasitologically to be infestations with *S. mansoni*. In cases clinically suspected of schistosomiasis with a history of possible latent schistosomiasis (bathing in infested

waters) but without eggs in the faeces specific antibodies were obtained in 40 per cent. The authors think that very possibly there exist in such cases unisexual infestations or infestations with a preponderance of male worms [see MAYER & PIFANO below].

In cases of advanced bilharzial cirrhosis the presence of antibodies ascites and splenomegaly of various degrees the presence of antibodies was always shown by the intensely positive reactions although in some of them there were extremely few eggs in the faeces. The Fairley reaction has thus a practical value for the diagnosis of infestations with *S. mansoni* in the sense that a positive reaction allows the conclusion that a trematode infestation exists and especially an infestation with *Schistosoma*. But the fact that the authors encountered 2 per cent of cases which were certainly infested with *S. mansoni* as parasitological examination proved yet showed negative reactions means that a negative reaction does not definitely exclude diagnosis of schistosomiasis in suspected cases. For this reason the authors are trying to perfect the reaction and to complement it with other biological methods.

G Lapa^e

LUTTERMOSER G W & PIFANO C F Aspectos epidemiológicos de la Schistosomiasis mansoni en San Casimiro (Estado Aragua) [Epidemiological Aspects of Infestation with *Schistosoma mansoni* in San Casimiro (Aragua State)] *Rev. Sanidad y Asistencia Social* Caracas 1942 June v 7 No 3 397-418 9 figs. (14 refs.)

The authors carried out an epidemiological study of schistosomiasis in San Casimiro Aragua State in the second fortnight of July 1941. San Casimiro the capital of the district of the same name in the north east of Venezuela is bordered to the south and west by two of the three rivers which form the natural water system of this region. The irrigation system is very limited and there are few canals near the town but the rivers are used by the people and in them the snail vectors of the disease are abundant. A map gives details of the water system and habitats of the snails (*Planorbis (Australorbis) glabratus*). A table gives the geographical distribution of the snail and the results of examination of them for cercariae. The local characteristics are described in detail. Human infestation was measured by the method done by the Stoll dilution method and when this failed to reveal eggs as it often did sedimentation methods were used. Measurement of the size of the liver by the hepatometric system of GABALDÓN [*Gaceta Médica de Caracas* 1933 40 219] which is similar to the method of measuring the spleen described by LANDELMAN [this *Bulletin* 1932 v 29 361] showed a correlation between the hepatometric index and the number of lateral spined eggs in the faeces (parasitic index).

The liver is the organ most attacked in schistosomiasis either mechanically or by toxins produced by the worms or by the eggs and JAFFE has therefore proposed to call infestations with *S. mansoni* not intestinal but hepato-intestinal schistosomiasis. In San Casimiro the authors observed (a) cases of bilharzial hepatitis either subfebrile or apyrexial in which hepatomegaly was the only external symptom 90 per cent of such cases had a history of dysentery and most of them had some degree of splenomegaly. (b) cases of hepatic hypertrophy with symptoms of cirrhosis accompanied by splenomegaly this was the most frequent form of cirrhosis seen and it was found in all the young persons. Of the three categories of cases established by

the authors the largest group were those with hepatomegaly and eggs in the faeces the smallest those with hepatomegaly without eggs in the faeces the third group had no hepatomegaly these infestations being possibly benign or too recent to have caused enlargement of the liver

Examination of the faeces showed that 78 per cent of the population were infested. This high incidence is explained by the fact that optimum conditions exist for the development of the snails and for the infestation of man and these are maintained in the endemic area. Procedures are recommended for a campaign against the disease. These include the destruction of the snails with lime where the soil is acid or with carbonate or sulphate of copper where it is alkaline the encouragement of the breeding of ducks cleansing of the waterways removal of vegetation and other measures designed to discourage the breeding of the snails. Education of the population about the disease and its mode of transmission supervision of the area encouragement of agriculture and industry in order to raise the economic level and the nutrition of the people and the establishment of a dispensary for treatment are other measures recommended.

G Lapage

MAYER M & PIFANO C F Estudios biológicos y patológicos en animales infectados con *Schistosoma mansoni* (infecciones bi y unisexuales) [Biological and Pathological Studies in Animals infested with *Schistosoma mansoni* (Bi and Unisexual Infestations)] *Rev. Sanidad y Asistencia Social* Caracas 1942 June, 7 No 3 419-28 [17 refs]

The authors worked especially with mice infested by putting them for half an hour in a container filled to a depth of 5 cm with water infested with numerous cercariae of *S. mansoni* which had emerged the same morning from the snails. Autopsies on the mice at intervals showed that the worms need about 40 days to attain maturity. Earlier than this they rarely found worms in copula or eggs in the liver or mesenteric veins. The simplest proof of maturity of the worms would be the presence of eggs in the faeces but the authors were habitually unsuccessful in finding these because the passage of eggs in the faeces by mice infested by the Venezuelan strain of *S. mansoni* is very rare. It is known that rabbits and rats infested with *S. mansoni* usually do not pass eggs in the faeces. OSTERLIN [this *Bulletin* 1935 v 32 250] however found eggs in the faeces of mice infested with a West African strain of *S. mansoni* with great regularity possibly because that strain was of greater virulence.

The authors found eggs in the faeces of 14 of their mice 50 days to 3 months after their infestation but other mice with larger infestations showed no eggs in the faeces. In 16 mice adult worms were found in the mesenteric veins three months after infestation in three mice they were present 3-4 months after infestation and in 34 examined from 1 to 18 months after infestation there were none in the mesenteric veins. The authors concluded that the worms are most likely to pass large numbers of eggs at a stage of the disease corresponding to a short time after their maturity is attained. They have data of a number of human patients at this stage who had a dysenteric syndrome and abundant eggs of *S. mansoni* in the faeces four to five weeks after their first infestation.

Tissue reactions against eggs deposited in the intestinal wall can very quickly impede the passage of the eggs into the gut cavity and this explains the absence of the disease. The number of eggs passed in the advanced stage of the disease is also influenced by the degree of infestation and by the faeces is also influenced by the degree of the infestation and by the proportion of the sexes of the worms present. Whenever their mice showed eggs in the faeces most of those that did had been infested with the same suspension of cercariae they never found that a single mouse of a given group showed eggs in the faeces while the others of that group did not. Autopsy on mice which were passing eggs in faeces showed an approximate equality of the numbers of male and female worms present. Autopsy of mice which were not passing eggs in the faeces showed a preponderance of one sex in one such group for example one mouse had 29 male worms and only one female another had 20 males and only one female and both had few eggs in the liver. The authors suggest that similar human infestations with a preponderance of one sex may occur and that when they do there might be no eggs in the faeces and all the symptoms would be produced either mechanically or by toxin produced by the worms. Such infestations can occur by chance. Since each snail may liberate daily some 2-3 000 (sic) cercariae of *S. mansoni* (all of one sex) and about 200 000 during its life of some months (HOFFMAN) unisexual infestation can occur by chance fairly often especially if the infestation is acquired by only one bathe in infested water.

A further cause of the absence of eggs from the faeces in chronic human cases may be the greater longevity of the male worms. One of their mice killed five months after infestation had only male worms and nodules and calcified eggs in the liver. No female was found. Other mice of this same group which died two to three months after infestation had many male and female worms.

The author thinks however that infestation by a single sex is the most important cause of the absence of eggs from the faeces. They summarize the experimental work which indicates that each snail liberates only cercariae of one sex. *J. Hyg.* 1921 v 1 1) suggested in *S. hispidus* as CORT (1921 v 1 1) suggested in *S. hispidus* that in the dry season only male cercariae exist in those the fertilized eggs. The experiments on the infestation of animals 69) conclusion that the dry season only male cercariae exist in those snails which survive. The experiments on the infestation of animals with cercariae from only one snail are still in progress at the time of writing but they had by then found in most of their unisexual infestations of mice a very variable necrosis of the hepatic cells which depended not on the number of the worms but on their position in the portal vessels. The cells of Kupffer were however always well preserved. This development occurs in both male and female unisexual infestations and they think it is due to immature worms. It may form the basis of a later cirrhosis with its clinical consequences.

G. Lapage

LUTERNOSER G. W. Destrucción de caracoles transmisores de *Schistosoma mansoni* en Venezuela [Destruction of Snails which transmit *Schistosoma mansoni* in Venezuela] *Rev. Sanidad y Asistencia Social* Caracas 1941 Dec 6 No 6 874-97 10 figs [19 ref.]

The main conclusions of this paper have already been briefly summarized in the abstract of Part II of the author's account of this work.

[this *Bulletin* 1943 v 40 849] Giving a brief review of the literature the author says that in Venezuela 20 per cent of the 2 000 autopsies done in the Vargas hospital during the last four years have revealed an infestation with *Schistosoma mansoni*. There is risk of infestation around Caracas and infested snails are frequently found in the irrigation system of Venezuela. The author's laboratory and field methods are then described together with the results on which the author bases recommendations for a campaign against the disease which are similar to those summarized in our previous abstract. The snails miracidia and cercariae can be killed by lime which in the quantities recommended is not toxic to domestic animals and does not harm the cultivated land which in Caracas and its neighbourhood is generally acid. The antibacterial action of the lime also purifies the water with a consequent reduction of other water borne diseases. *G Lippage*

SANABRIA A El electrocardiograma en la miocarditis bilharziana [The Electrocardiogram in Bilharzial Myocarditis] *Rev Polí clinica Caracas* 1943 Juli-Aug v 12 No 71 203-12 5 figs [11 refs]

The following is a translation of the summary and conclusions —

(1) We studied 15 cases of bilharzial myocarditis with the electrocardiograph. The P wave was modified in one. In another the P-R interval was prolonged. Bundle branch block occurred in three cases. Low voltage in 3. Notching of QRS in 2. Modification of the T wave in 4. And in 1 case the Q-T interval was prolonged.

(2) There is no typical electrocardiographic sign in bilharzial myocarditis comparable with what is shown by autopsy. Nor is it possible to distinguish the signs from those of syphilitic cardiac disease.

(3) The results obtained are discussed. *J F Corson*

VON BONDORFF B The Inhibitory Effect of *Diphyllobothrium latum* on the Proteolytic Activity in Vitro of Depepsinized Human Gastric Juice. *Diphyllobothrium latum* and Pernicious Anemia III. *Acta Med Scandinavica* 1940 v 105 No 5-6 502-15 11 figs

The gastric protease which is active at a pH range from 5 to 9 and above—and which is supposed to be identical with the so called intrinsic factor—is greatly inhibited in its hydrolytic capacity in vitro after the addition of even relatively small amounts of a suspension of fresh *Diphyllobothrium latum*. The inhibitory effect is well preserved in dried worm but it gradually becomes weaker in dried worm which is stored more than 3-4 months. The inhibiting substance is destroyed by heating to 80 C for 20 minutes. It is not dialyzable and is not soluble in ether nor yet in 96 per cent ethyl alcohol. It cannot be precipitated with 50 per cent alcohol but can be precipitated quantitatively in 90 per cent alcohol. The inhibitory effect is equally great independent of the pH at which the aqueous extracts are prepared (proved for pH 1.7 to 9.0) and it is obviously not conditioned by any product arising during the autolysis of the worm. In other words the inhibitory substance is to be found preformed in the worm. [See also this *Bulletin* 1940 v 37 215 216]

- VON BONDORFF B. On the Reticulocyte Response and Course of Remission after Removal of the Worm in Patients with *Diphyllobothrium latum* and Pernicious Anemia. *Diphyllobothrium latum* and Pernicious Anemia IV. *Acta Med Scandinavica* 1940 v 105 No 5-6 516-59 13 figs

In *Diphyllobothrium latum* carriers with pernicious anemia the expulsion of the worm is usually followed by a definite reticulocyte response and blood regeneration. In these cases the anemia can be regarded as caused by the parasite. In certain cases the worm infestation only represents an incidental association with the anemia—the administration of the anthelmintic is not followed by remission. In some cases of cryptogenetic pernicious anemia it seems that the presence of *Diphyllobothrium latum* makes the disease picture worse.

The reticulocyte response in cases of pernicious tapeworm anemia after the worm has been expelled does not reach quite such high values but instead lasts considerably longer than after injections of a potent liver preparation. In both cases the remission proceeds at the same rate (about 100 000 red blood corpuscles/1 mm³ per day).

Already 48 hours after the expulsion of the worm a change of the megaloblastic proliferation in a normoblastic regeneration type could be proved in the sternal marrow.

It has not been possible to confirm any obvious correlation between the amount of gastric juice and the occurrence of free hydrochloric acid on the one hand and the intensity of the regeneration after the removal of the worm on the other.

- VON BONDORFF B. On the Proteolytic Activity in Vitro at Neutral Reaction of Gastric Juice from Patients with Cryptogenetic Pernicious Anemia and with Pernicious Anemia due to *Diphyllobothrium latum*. *Diphyllobothrium latum* and Pernicious Anemia V. *Acta Med Scandinavica* 1940 v 105 No 5-6 540-57 [Numerous refs]

The proteolytic gastric enzyme active at neutral reaction—like the intrinsic factor—is present in cases of pernicious anemia in *Diphyllobothrium latum* carriers where the blood disease is proved to be due to the infestation with the worm as well as in cases where this connection is more or less uncertain for different reasons. This enzyme also occurs regularly in cryptogenetic pernicious anemia.

- HIRVONEN M. Serumisenuntersuchungen an *Bohreriaephagus latus* und *Taenia saginata* Patienten. [Studies on the Serum Iron of Patients Infested with *Diphyllobothrium latum* or *Taenia saginata*.] *Acta Med Scandinavica* 1941 v 108 No 1-2 63-72 2 figs

Hitherto the serum iron in patients infested with *Diphyllobothrium latum* and *Taenia saginata* has not been studied. In earlier work the author found that the serum iron varied from the normal in some patients with intestinal worms. In both his earlier work on serum iron (*Duodecim* 1940 v 56 533 *Acta Med Scandinavica* 1941 v 106 495) and in the present work the author used the method of HEILMEYER and PLOTNER (Das Serum eisen und die Eisenmangelkrankheit. Jena 1937) to determine the serum iron.

The author studied 77 patients the serum iron values of all of them were determined before treatment of the worm infestation and the values of 36 of them were taken once or more after treatment. A table gives the values before treatment the sex of the patients the haemoglobin percentage the number of red blood cells and the diagnosis (19 came to hospital for treatment of the worm infestation only and 58 had other diseases as well). As the lower limit of the normal values the author took 80 gamma per cent for males and 60 gamma per cent for females. The threshold between the normal and increased serum iron values is not so sharply defined. Discussing this the author refers to the work of HEILMEYER and PLOTNER (*op cit*) and WALDENSTROM (*Nordisk Med* 1940 v 8 1703) and selects as the threshold between normal and increased serum iron values the figures 160 gamma per cent for males and 170 gamma per cent for females. *Diphyllobothrium* was found in 74 cases and *Taenia saginata* in 3. In 43 the serum iron was normal in 18 (6 men and 12 women) it was increased in 16 (6 men and 10 women) it was below normal.

Among patients with normal values 11 had worm infestations only 32 had other diseases as well. Of the patients with values below normal all had *Diphyllobothrium latum* and all had other diseases as well. In three of these cases the worm played no part in the decrease of the serum iron. Of patients with increased values 4 all of them women had severe anaemia one had orthochromic and three had hyperchromic pernicious anaemia stated to be due to the presence of the worm. The remaining 14 (6 men and 8 women) had no anaemia 8 of these had worm infestations only and 6 had other diseases as well in this group two women had *T. saginata* and six men had *Diphyllobothrium*. The author thinks that the worms were partly responsible for the increased values in two women in this group infested with *Diphyllobothrium*.

The effect of treatment of the worm infestations was studied in 16 patients in whom the serum iron values were normal before treatment. After treatment these values varied but within normal limits and irregularly. In 16 cases with increased serum iron before treatment the values decreased after treatment in all but two cases within the first 24 hours and were after four days practically normal in all. In the two exceptions the values remained above normal but these two cases could not be followed up longer than two days because of the discharge of the patients. It was hardly to be expected that treatment of the worm infestations would affect the serum iron in cases in which this was decreased because this decrease was apparently not due to the worm. In four such cases studied all of whom had anaemia worm treatment appeared to have no effect on the serum iron. In two of these cases it remained below normal and in two it was increased.

G Lapage

MUKERJI A K & BHADURI N V Increasing Incidence of *Taenia solium* Infection in Calcutta *Indian Med Ga* 1944 Jan v 79 No 1 19-20

During the years 1928-1942 only three cases of infection with *Taenia solium* were observed by the authors among 20 664 persons examined during the same period there were 231 cases of infection with *T. saginata*. In 1943 up to the middle of August they saw six cases of infection with *T. solium* (and 22 of *T. saginata*) among 887 persons examined. This increase is attributed to an increased demand

for pork arising from the present abnormal increase in the city's population. Those affected were an English Government official (pork and sausages), a European nun (pork and sausages), a cooke (pork), and three Anglo-Indian children (sausages). J. F. Corson

JONES MYRNA F. & HOLLANDER A. Effect of Long Ultra violet and Near Visible Radiation on the Eggs of the Nematodes *Enterobius vermicularis* and *Ascaris lumbricoides*. *J. Parasitology* 1944 Feb. v. 30 No. 1 26-33 6 figs

In a previous paper [this *Bulletin* 1941 v. 38 526] the authors found that the greatest sensitivity of the eggs of *Enterobius vermicularis* was at wave lengths below 2400Å. They now report the effects on the eggs of this species and of *Ascaris lumbricoides* of radiation in the 3500Å and 4900Å range exclusive of short ultra violet and infra red radiation. The mercury vapour lamp and methods employed are described and a brief summary of the literature is given.

Lethal effects on the eggs of both species were observed after radiation with sufficient energy. The effects were most pronounced at 35-38°C and were less rapid at 23-28°C below 20°C (i.e. at 8-15°C) many eggs survived the exposure given (up to 199×10^7 eggs per cm²). There were no marked differences in the resistance of eggs in water or when they were dry, but the difference noted suggested that dry eggs were rather less resistant. The energy necessary to produce a damaging effect with radiation in this 3500Å to 4900Å range is very great if it is compared with the ultraviolet radiation at wave lengths shorter than 3000Å. The energy necessary for lethal action on eggs of *Enterobius vermicularis* at wave lengths above 3500Å is approximately 1000 times that necessary at wave lengths below 3000Å. The region of the spectrum which was produced experimentally is quite intense in sunlight although the distribution of wave lengths within the range is not the same. Sunlight might be expected to be more damaging than the mercury radiation used in these experiments and may be expected to be lethal if it is given enough time to act especially if it is correlated with high temperature and low humidity. The authors compare the delayed development of some of the *Ascaris* eggs with their delayed development under conditions of low oxygen consumption and suggest that the radiation may affect the respiratory system of the eggs. (Lapa e)

TRIM A. R. Experiments on the Mode of Action of Hexyl Resorcinol as an Anthelmintic. *Parasitology* 1944 Mar. v. 35 No. 4 209-19 9 figs 10 refs.

With the object of getting further information about the action of anthelmintics the author studied the mode of action of hexylresorcinol because this drug has been studied pharmacologically and has been shown to be the most active of a large number of phenolic substances against *Ascaris* and hookworms (LAWSON *et al.* *J. Pharmacology* 1935 v. 53 198-218 27 234 and 239) [see also this *Bulletin* 1936 v. 33 577]. Trim used the coupling reaction of phenols with diazonium compounds to form azo dyes and found that it could be used as the basis of a quantitative method. He based his procedure on the method

used by DANGEFFIELD GAUNT and WORMALL [this *Bulletin* 1938 v 35 714] for the determination of Bayer 205

Aliquots of solutions of a variety of amines were diazotized and buffered with acetate an aliquot of standard hexylresorcinol solution was then added and the development of colour was studied The orange red colour obtained with *p* aminobenzoic acid was selected as the best for the estimation of hexylresorcinol in chopped up tissues of *Ascaris* For details of the author's methods the paper itself must be consulted It was found that the same reaction could be used to detect and determine a large number of phenolic substances as well as hexylresorcinol

Preliminary experiments showed that hexylresorcinol could be made to pass through the cuticle of *Ascaris* much more easily than through the mouth and anus When cannulae were put in both ends of the worm saline could be passed through it if sufficient pressure was exerted But when the cannula was pushed past the powerful oesophageal musculature strong resistance was encountered which suggested that the other parts of the gut exert a strong pumping action The gut capacity of worms about 30 cm long was roughly one third cc When one third to one half cc of saline at 37 C coloured with trypan blue or chicago blue was injected with a hypodermic syringe through a cannula inserted through the mouth or anus this solution penetrated for about one third of the length of the gut but was often ejected by the worm with considerable force There was even greater resistance to the injection of a solution containing 1/2000 hexylresorcinol When the external orifices were excluded by means of ligatures after the injection through the mouth or anus of 0.5 cc of 1/2000 hexylresorcinol the worms were paralysed within a few minutes as far as the drug had penetrated but the rest of their bodies remained active for at least six hours and only slight penetration of the drug was detected On the other hand worms kept in 1/2000 hexylresorcinol in saline at 37 C were paralysed after half an hour whether their external orifices were excluded by ligature or not and by that time these worms showed strong evidence of penetration of the drug through the cuticle Worms which were ligatured but not injured lived for 24 hours

The rate of penetration of hexylresorcinol was studied by ligaturing off the external openings of some worms and not of others and immersing them all in a large volume of 1/2000 hexylresorcinol at pH 6.5 and 37 C Pairs of worms were removed at intervals The amount of drug penetration was measured by determination of the amount recovered from the tissues The rate of penetration in both ligatured and non ligatured worms was of the same order which was further proof that the main path of entry was through the cuticle Different worms showed different rates of penetration which were not correlated with their size nor entirely with their surface area Penetration of the drug went on until its concentration inside the worm was 5-6 times that in the outside medium and the worms retained the drug The initial rate of uptake is roughly proportional to the initial concentration in the surrounding medium The pH of the external medium over the range (pH 4-8) used which exceeds that likely to be encountered by the worm in its host had no significant effect on the rate of penetration Anaerobiosis likewise had no significant effect

The effect of the intestinal contents of the host on the rate of uptake of the drug was studied *in vitro* and by one experiment *in vivo* For the latter a pig was given 1 gm of hexylresorcinol and its stomach and intestinal contents were removed five hours later for examination

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Only a relatively small proportion (1/30 000) of the drug was present in the unfilterable portion of the intestinal contents and none was found in the stomach.

In the *in vitro* experiments the uptake by *Ascaris* from a 1/4 000 solution of hexylresorcinol was tested in the presence of various biological substances at pH 6.5 and at 37°C. Among the substances which had no effect on the uptake of hexylresorcinol were degraded peptonized and completely hydrolysed proteins, Witte's peptone and products of the hydrolysis of ovalbumin. Ovalbumin has however some inhibitory effect but this and other native protein would be partly digested before they reached the site occupied by the worms and therefore might not be inhibitory *in vivo*. This would not however be true of mucin which strongly inhibits the uptake of hexylresorcinol and is usually present around the worms. Among carbohydrates tested starch seemed to inhibit and 1 per cent glucose to increase the uptake of the drug. Among fats neither a 1 per cent suspension of olive oil nor glycerol had any effect but 1 per cent 0.5 per cent and 0.25 per cent solutions of sodium oleate completely inhibited the uptake. Lower concentrations however increased the rate of uptake. The addition of 1 per cent of ox bile salts caused more than 90 per cent inhibition of the uptake. Tests done with detergents (saponin, cholic acid, sulphated lauril etc.) showed that there is no direct correlation between surface activity of the substance and its inhibiting capacity. The data suggest that the bile salt inhibits the uptake by changing the physico-chemical state of the hexylresorcinol. Results of an investigation of the nature of this change will be published later. It was found that urea, glycerol, thiocetic acid, sodium saccharate, caffeine, ethyl and amyl alcohol, urethane, chloroform and diethyl aniline neither increased nor decreased the uptake of the drug.

The general conclusions are that the effects obtained *in vitro* most probably obtain *in vivo*. This is very likely in the case of mucin. Absorption of the drug on to mucin may remove it from the sphere of action but it may also provide a reservoir of the drug from which a continuous supply may be obtained at a low concentration for a long time. The effect of bile salts on the other hand is likely to be quite different *in vivo* because of the interference of numerous components of the complicated emulsion in the small intestine. G. Lapa

CLEAFIN P. A. Some Observations on Filariasis in British Guiana and its Treatment. *British Guiana Med. Ann.* 1943 1-12 [16 ref.]

After noting that the absence of microfilariae from the blood is not evidence of the absence of filariasis and that a positive result is even when microfilariae are absent the author discusses the causation and treatment of some of the symptoms. He points out that the pathological changes observed have been attributed to blocking of the lymphatics by the adult worms to infection of oedematous and devitalized tissues by haemolytic streptococci and other organisms and to an allergic reaction to the parasite. He discusses the literature on the presence or absence of haemolytic streptococci and other organisms in filarial lesions and concludes that all three of the causes just mentioned operate. The itching, urticaria and arthritis of filariasis cannot however be due either to lymphatic obstruction or to bacterial infection. The author thinks that O'Connor (this Bulletin 1937 v. 29 766) is probably right when he attributes them to allergy.

If the author says the allergic hypothesis is correct it may be as well that there is no known method of killing the parasites because if large numbers of them were killed there might be serious anaphylactic shock. ROSE's treatment with streptococcal vaccines [this *Bulletin* 1918 v 11 91 1919 v 14 156] has given good results in British Guiana. Originally three injections at intervals of two weeks were given the first of 100 million killed streptococci and the next two of 200 million each but a longer course with a higher terminal dose is now given. Relapses occur however and some patients do not react. The author is now trying desensitization with extracts of *Dirofilaria immitis* of the dog. Dried adult *D. immitis* are ground up and 1 gm of the powder is extracted with 100 cc of carbolic saline (0.85 per cent sodium chloride and 0.5 per cent of carbolic acid). After refrigeration for 24-48 hours this extract is passed through a Seitz filter and diluted to 1 1000 1 10000 1 100000 and 1 1000000. Subcutaneous injections of 0.1 cc of the 1 1000000 dilution are first given. Injections are continued weekly until 10 cc of the 1 1000 dilution has been given. The rate of increase of the dose is slow at first and depends on whether or not there are focal reactions (itchings urticaria oedema or occasionally an attack of filarial fever). Vaccines are given at the same time. It is too early as yet to give results in detail but this treatment promises to be of value in amelioration of symptoms prevention of attacks and prevention of elephantiasis. G Lapage

BURHANS R A CAMP J D BUTT H R & CRAGG R W Lymphangitis of Suspected Filarial Origin. A Preliminary Report concerning Its Treatment. *U S Nav Med Bull* 1944 Feb v 42 No 2 336-40

Forty six men of the United States Navy returned to America from the South Pacific area diagnosed as suffering from lymphangitis which was thought to be due to filarial infection though no parasites had been found. Since filariasis is of rare occurrence in white men and had not hitherto been reported in naval personnel stationed in the South Pacific these cases were specially examined.

Length of duty in the island—The interval between the time of possible exposure to infection and that of the onset of symptoms varied from 3 months to 21½ months. It is an interesting fact that all developed their symptoms in the four months September to December.

Place of work—Though a few stayed about the shore most of the men worked inland in the jungle.

Symptoms and signs—These seemed to be the same in the original attack as in recurrences. In order of frequency the parts commonly involved were the spermatic cord epididymis and testicle the arm more frequently the forearm the thigh and popliteal space the upper eyelid and the scrotal sac. The onset usually occurred at night the patient would be awakened by a sharp drawing pain in the region involved. Fever was rare mild and of very short duration and the symptoms were usually only local. When the scrotal contents were involved the first complaint was of soreness and tenderness of one testicle rarely of both. This was followed by swelling and often by lumps in the groin. The soreness subsided in three or four days leaving a local swelling of the spermatic cord or testicle and lymphatic enlargement. In the arm or leg in some cases the lymph glands were swollen.

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with red streaks of the skin progressing distally while in others small tender knots or elongated lumps developed along vessel paths or at the edges of muscles sometimes there was a diffuse thickening of the subcutaneous tissue. Weals followed by itching appeared in some patients and disappeared within a few hours. None of the men had elephantiasis but many on arrival had swelling of the spermatic cord epididymis of leg or arm and nearly all had adenopathy.

In many cases there had been only one attack and these patients were given physical exercises which however were followed by recurrence of pain and swelling. During the recurrences eosinophilia was marked in nearly all cases. No microfilariae were found. In the island the eosinophilia had ranged from 3 to 37 per cent and after return to America it also varied from 1 to 27 per cent. Biopsies of three lymph glands and three lymph channels gave negative results and no microfilariae were found in hydrocele fluid of one patient.

During the course of these investigations a patient was transferred from another hospital. He had originally returned from the same South Pacific island with similar symptoms and an adult female filaria had been found in a biopsy of a lymph channel near the wrist. The authors consider that they may assume that all these cases are similar in spite of negative laboratory findings.

Treatment—Sulphonamides had no apparent effect and surgery was not indicated in these cases. X-ray therapy was tried and found to cause prompt decrease in the size of enlarged lymph glands as improvement remained after exercise to test it as given to all suitable patients according to the following prescription: 140 kilo volts 15 milliamperes 0.5 cm tube current 100 r units every other day giving a total of 315 r units including back scatter to each area. This was followed by 30 day leave. The men have not returned to hard outdoor work for 4-6 weeks and the results will be reported later.

J F Corson

LOWMAN, E. W. Incidence of Filariasis in Children. U.S. Nat. Med. Bull. 1944 Feb 40 No 2 341-3 [11 refs]

Microfilariae of *Wuchereria bancrofti* were found in 15.9 per cent of fresh blood preparations taken from 201 natives of a South Pacific island where elephantiasis was common. The persons examined included infants, children and adults. The incidence of infection was very low in persons less than 20 years old and as highest in those aged 20-35 years. Males were infected twice as frequently as females. Microfilariae were found in two children, one aged 2 years and the other 3½ years. The youngest age at which elephantiasis was observed was 18 years.

The object of the enquiry was to obtain some evidence of the time of exposure necessary for a filarial infection to become discernible so as to be able to estimate the risk to American troops living in the island. Several cases of infection of young children with filaria have been recorded previously. The early appearance of filariasis is therefore quite possible and this should be borne in mind by medical officers and periodical examinations should be made.

J F Corson

LIGHTNER G H & PATTERSON W B **Trichinosis** Report of Four Cases *Hawai Med J* 1942 May v 1 No 5 302-3

The clinical picture of trichinosis has been briefly reviewed and 4 cases of this disease occurring on the Island of Maui have been reported

DEFICIENCY DISEASES

THOMSON E L **Beri Beri** a Description of the Condition in Ratings of the Straits Settlements Royal Naval Volunteer Reserve, and a Commentary on the Clinical Appearance and Diagnosis *J Roy Nav Med Serv* 1914 Jan v 30 No 1 6-12 [19 refs]

An interesting paper and very informative to those who coming newly into contact with patients in the tropics know beriberi merely from their text books as having dry and wet forms

The author's remarks are based on 43 cases under his observation during the short period of three months. Many of the patients complained only of loss of appetite epigastric discomfort and perhaps of pins and needles in the fingers and toes or of weakness fatigue shortness of breath and palpitation on slight exertion. On examination many show an unexpected anaesthesia over the lowest third of the tibia in the early stages a dulling of sensation but with hyperaesthesia of the calf muscles of both legs with stiffness and weakness and consequent avoidance of walking. Those who work much with their hands usually present both motor and sensory changes in the hands wrists and arms earlier and more than in the legs. Besides the pricking sensations and numbness burning itching and formication are common. All the forms of paraesthesia seem to be worse on cold and wet days. As for motor disturbances the muscles most often involved are the extensors of the foot those supplied by the anterior tibial and peroneal nerves being the first to suffer then the calf muscles the extensors of the leg and the glutei in that order. In severe cases the intercostals diaphragm and laryngeal muscles may become involved. The gait is rather of a shuffling than of a steppage character like walking in stiff clay.

Wet beriberi should not be regarded as a distinct type but as dry beriberi with superimposed oedema. The cardiac symptoms of palpitation oppression and dyspnoea are often worse at night and in the acute cardiac type *shōshin* there may be signs of acute dilatation sudden collapse and distress restless tossing from side to side and agonizing cardiac pain oedema of feet enlarged and pulsating liver.

Signs of other vitamin deficiencies may be and usually are present such as eczematous scrotal dermatitis cheilosis burning sensation in the mouth with reddening of the lingual papillae and in a few patients hemeralopia in others dryness and roughness of the skin and absence of sweating.

Apart from the symptoms detailed above the squatting test is of value in the diagnosis of early cases—pain on assuming the position usually comfortable to the oriental and difficulty in rising from it without the aid of the hands. The author mentions two other tests

easily applied (i) Holding the breath Whereas healthy Malays and Chinese can do this for about a minute beriberi patients in the sub-acute stages can only do it for 15-20 seconds in the severe stages for less than 10 seconds (ii) Keeping the arms horizontal Beriberics can do this for 25 seconds or less the healthy for minutes

Inquiring into the diet of his patient the author found that it consisted largely of overmilled white Siamese rice sun-dried in the husk then threshed and bagged Improvement set in when this was changed for Grade I parboiled rice and reconstituted brown bread recently produced in Malaya was substituted for white bread marmite for coffee and certain vegetables with high vitamin B content added such as Katjang idjoe (*Phaseolatus radiatus*) tawoy and tahoo [we cannot trace the botanical names of these] In four months beriberi was no longer to be observed among these ratings and their capacity for physical exertion had been in good part restored
H Harold Scott

ASHBURN L L & LOVRY J V Development of Cardiac Lesions in Thiamine-Deficient Rats *Arch Pathol* 1944 Jan 37 No 1 7-33 1 fig [19 refs]

LAHRI K D Pellagra in Bihar India *Physician* 1943 Dec v 7 No 1 4-4 [18 refs]

A report of five cases

HAEMATOLOGY

PRASAD B N & CHOWDHURY N K Normal Haemoglobin Values of the Population of Bihar *Indian Med Ga* 1943 Sept v 78 No 9 429-31

Considerable variations most probably dependent on dietary habits and economic status are common in haemoglobin values of populations in different parts of the world Thus in Bengal and Assam the haemoglobin values of labourers varies between 11.83 and 13.74 gm per hundred cc of blood while for the middle class and student population the average figure is about 14.50 gm In Britain the normal value lies between 14.50 and 15.60 gm and in U S A it is about 16.0 gm per 100 cc blood

In the present survey the population was divided into five groups according to social and economic status and the average haemoglobin values for males and females of each group were determined with a Hellige haemometer calibrated so that 100 per cent was equivalent to 13.75 gm Hb per 100 cc blood The first group consisted of labourers poor cultivators and service people earning low wages whose diet was mainly formed of *salu* (finely crushed parched gram and barley) coarsely crushed maize *kharsa* (*Lathyrus sativa*) potatoes and occasionally green vegetables and milk The second group comprised middle-class cultivators petty craftsmen small shopkeepers poor students and poor clerks whose diets were superior to that of the first group Group three consisted of landowners petty zemindars clerks students and business men who lived mainly on a diet of rice deficient in animal products Group four included large landowners zemindars

service people and students whose diet consisted of rice and *atta* [wheat flour] milk vegetables and occasionally animal products. Group five consisted of zemindars business men students of well to do families and service people drawing about Rs 200 per month these people lived on a mixed diet regularly containing meat or fish.

The average haemoglobin values of the various groups are shown below —

Group	Average Haemoglobin values in gm Hb per 100 cc blood	
	Males	Females
I	10.94	10.12
II	12.42	11.42
III	13.63	13.20
IV	14.12	14.41
V	14.70	13.29
All groups	13.63	12.49

The most efficient dietary sources of iron are liver cereals such as dals and oat dried fruits such as figs and dates and green vegetables. Red meats often thought to be rich in iron have in fact little available iron. For adequate assimilation ionizable iron is more important than the total iron of the diet and in certain circumstances a vegetarian diet may be superior to a meat diet in this respect. A daily average intake of 10 to 15 mgm of ionizable iron is required and the investigations indicated that adequate amounts of such iron were being obtained by the great majority of the population of Bihar. A further analysis of the haemoglobin values for varying age groups showed no appreciable difference for males between the ages of 11 and 40 but there was a slightly lowered value between the ages of 41 and 50. In the female population the highest value was found between the ages of 21 and 30 with slightly lowered values between the ages of 11 and 20 and between 31 and 50.

F Murgatroyd

FOY H & KONDI Athena Ehrlich's Megaloblasts associated with Low Mean Corpuscular Volume and Red Cell Diameter *Lancet* 1943 Oct 23 505-6 1 chart [20 refs]

During the course of a nutritional anaemia survey in the Bechuana land Protectorate Africa Foy and Kondi came across a case of chronic untreated amoebic dysentery in a nine months pregnant negress who had been suffering from persistent diarrhoea throughout pregnancy. The red cell count was 2 627 000 haemoglobin 7 per cent [7 gm per 100 cc] colour index 0.92 white cells 3 440 MCV [mean corpuscle volume] 69 μ MCD [mean corpuscle diameter] 6.75 μ . A marrow biopsy showed typical Ehrlich's megaloblasts similar to those found in untreated Addisonian pernicious anaemia and nutritional macrocytic anaemia of India and Macedonia. The authors are surprised to find these cells in an anaemia with low mean corpuscular volume and diameter. [The most likely explanation of the finding which they do not however discuss is that the patient was suffering from a dual type of deficiency so often seen in the tropics. If she had been

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treated with iron it is not unlikely that the type of anaemia would have changed and that the microcytosis would have given place to macrocytosis]

LERO G & LINHARD J A propos de deux affections hémato-lytiques
(anémie a hématies falciformes et leucémie myéloïde) observées a Ayos
(Cameroun) [Sickle Cell Anaemia and Myeloid Leukaemia in the
French Cameroons] *Rev Sc Méd Pla* 1 et de l'Afr 9 10
France Libre 1943 Juin No 3 719-45 (19 refs)

VENOMS AND ANTIVENOMES

MAEGRAITH B G The Identification of the Poisonous Snakes of
British West Africa I—Keys to Genera and Species *Ann Trop
Med & Parasit* 1944 Apr 19, 38 No 1 21-34 8 fig

A valuable piece of work. The author describes the correct way of making an examination of a snake whose identity is to be determined the method to be adopted namely first the head and the teeth then the head scales or shields next the body scales dorsal and ventral the tail and the body markings. The care illustrated by a line drawn in He then applies the criteria and gives a list of West African snakes 25 Colubridae of which 19 belong to the Ophiophyllophaga and 6 to the Proterophyllophaga and 12 Viperidae and concludes with a schematic key for the identification of each

H Harold Scott

WILSON H Acute Abdominal Symptoms in Arachnidism Black
Widow Spider Bite *Surgery* 1943 June, 13 No 6 924-30
[2 refs]

The black widow spider *Latrodectus mactans* is found throughout the United States and Canada and record of bites are becoming more frequent. It is present in good and field but is not infrequently found in garages, basements and outhouses. The author gives a description of the symptoms produced by the bite especially the muscular cramps and the spreading excruciating pain the board like rigidity of the abdominal muscle may suggest a diagnosis of acute abdominal lesions which have in a number of cases led to needless laparotomy. Many treatments have been tried and as a result of observations in 26 cases the author advocates the use of morphine frequent hot baths (which afford great relief) and injections of specific antiserum. Intravenous calcium gluconate has been recommended but exerts relatively little effect on the general condition. Intravenous calcium chloride and magnesium chloride have also been recommended. Intravenous Mortality is low though a few authors have reported fatal cases in the present series there were no deaths.

Charles H. Hocks

DERMATOLOGY AND FUNGOUS DISEASES

CAMPOS J A Hemoculturas nos surtos febris do pêfingo foliaceo (Fogo Selvagem) [Blood Culture in Febrile Exacerbations of *Pemphigus foliaceus* ('Wild Fire')] *Hospital* Rio de Janeiro 1943 Aug v 24 No 2 187-98 [22 refs]

Many organisms have been cultivated from cases of *Pemphigus foliaceus* during the exacerbations Gram positive diplococcus by CARRERA *Ps pyocyanea* (PETGES and BICHECONE) *Streptococcus viridans* (FELIE and VAGELL) a Gram positive coccus probably a streptococcus (EBERSON) and named [for some obscure reason] *Bacterium pemphigi* The present author has observed over 600 cases and in this communication deals with 130 in hospital He states that he cultured the blood during febrile exacerbations the duration of the patients illnesses varied from 7 days i.e. an early acute attack to chronic cases of 30 years standing He states that in every one of these he was able to isolate a haemolytic streptococcus in pure culture and he concludes therefore that this organism is the probable cause of *Pemphigus foliaceus* [The organism is not defined further and it is possible that a transient streptococcal infection might cause febrile reactions in any chronic disease without being in any way aetiologicaly related to the disease itself See also this *Bulletin* 1927 v 24 451 1943 v 40 487 488] *H Harold Scott*

RODHAIN J Quelques données au sujet des teignes au Mayumbe [Some Data on the Tineas of Mayumbe] *Ann Soc Belg de Méd Trop* 1943 Mar 31 v 23 No 1 63-6 3 figs on 1 pl

In the forest region of Mayumbe Belgian Congo the author observed in children of 6 to 15 years an unusual type of favus in which the whole scalp area is covered by yellow crusts with a great deal of white scaly matter giving the appearance of a white helmet It is probably similar to the witkop of natives in South Africa In some cases the typical favic cup was found also on the shoulder or breast All cases were proved microscopically and by culture of *Achorion Schonleini* In contrast to the favus of Europe the Congo disease tends to resolve spontaneously at puberty like that described by CATANEI in Algiers

An endothrix type of trichophytosis was also observed and the causative fungus was identified as probably *Trichophyton soudanense* Joyeux previously found in the Sudan and the southern desert area of Algeria It is much like the *T sulphurum* of Britain

J T Duncan

ODALY J A La cromoblastomicosis en Venezuela [Chromoblastomycosis in Venezuela] *Rev Sanidad y Asistencia Social* Caracas 1943 Aug v 8 No 4 655-79 8 pls [31 refs]

Chromoblastomycosis has only come to knowledge in Venezuela in recent years the first case having been recorded in August 1937 and says the author three cases only have been already published Search through the literature has revealed 58 cases in S America 34 in Central America 7 in N America 3 each in Europe Asia and Oceania and 2 in Africa 110 in all Three genera are known as causative *Fonsecaea* *Hormodendron* and *Phialophora*

The author gives a general account of the condition with notes of five cases (1) A man of 50 years with ulcerating fungating lesions of the right foot from which *F. pedrosoi* was isolated (2) A man of 37 years with verrucose nodules of the lower part of the right leg due to the same fungus and starting five years previously (3) A man of 40 years showing scars of healed ulcers and other ulcers unhealed on the lower part of the left leg dating back about three years. The patient was in apparent good health but the Wassermann and Kahn reactions were both 4 plus (4) A negro of 10 years blind with fungoid growths on the right gluteal region (5) A man of 24 years with a history of a lesion starting three years before as a papule which did not heal but was not painful. It spread and was surrounded by satellite papules which later became painful and bled easily.

The lesion usually arose in some site of small injury such as the prick of a cactus thorn. Iodine in large doses for a long time may do good but surgical treatment is almost always needed. *H. Harold Scott*

SCHLUMBEIGER H. G. & SERVICE A. C. A Case of Histoplasmosis in an Infant with Autopsy. *Amer. J. Med. Sci.* 1944 Feb v 207 No 2 230-39 7 fig.

Little is known of the epidemiology of histoplasmosis. The disease has attacked persons in all age groups and several cases have been reported in very young children. The present paper describes a case in a male infant aged only seven weeks—the youngest case on record. The child was born by normal delivery after eight months gestation and was never breast fed. After two weeks in hospital (probably in Philadelphia) the child was taken to its mother's home for a month and then to another hospital. The time and source of infection are not known but it is presumed to have occurred during the month spent at home. At seven weeks the child was suffering from bronchitis and secondary anaemia with associated enlargement of the spleen and liver. At nine and a half weeks it died.

Diagnosis of histoplasmosis was made from spleen and bone marrow smears two days before death. A good account is given of the post mortem findings especially the morbid histology which is well illustrated by photomicrographs. The lesions were diffused throughout the body but the greatest changes occurred in the spleen, liver and lungs.

Although the fungus was easily cultivated from biopsy material taken two days before death attempts to cultivate it from materials taken on four after death failed. Mice inoculated intravenously with the culture died in three to four months and a description is given of the morbid histology in these animals. *J. T. Duncan*

MISCELLANEOUS

BULMER E. A Survey of Tropical Diseases as seen in the Middle East. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1944 Feb v 37 No 4 225-36. Discussion 236-42 [SCOTT H. H. Chairman. BARBER C. H. MANSON. BAHR P. BUXTON P. A. CHESTERMAN C. C. MORTON T. C. STANNUS H. S. MACDONALD G. FELIX A. BOYD J. S. H. BULMER E. (in reply).]

In 22 months at a military hospital in Egypt with 1200 beds there were about 17000 medical admissions. The patients were chiefly of

British stock but a native section of 47 beds provided an opportunity for seeing non indigenous tropical diseases. The total sickness rate was low the average number of admissions of sick and wounded representing about 8 per cent of the Force. The proportion of medical to surgical admissions was three to two.

Of the medical admissions tropical diseases accounted for 40 per cent or if desert sores are included 50 per cent. Two-thirds of the tropical cases were acute diarrhoeas and one third pyrexias with possible splenomegaly. The usual stay in hospital was between two and three weeks with often another week at a convalescent depot. The incidence of non tropical diseases was generally similar to that in England with the notable exception that chronic dyspepsia accounted for only 4 per cent of the admissions.

Probably every soldier in the Middle East Force had at least one attack of acute diarrhoea usually soon after arrival and it was considered that only about 6 per cent of those reporting sick with diarrhoea were sent into hospital. Some immunity seemed to be developed as in the second summer acute diarrhoea was rare excepting among newly arrived troops. The seasonal incidence showed two main peaks—in early and in late summer—the drop at the height of the summer being associated with the diminution in the numbers of flies. Cases of dysentery were rapidly classified clinically into those with blood and mucus in the stools and those without. The latter whose condition was termed acute catarrhal enteritis were the mildest cases and accounted for 56 per cent of the dysenteries. Their average stay in hospital was 10 days. The former group described as having clinical dysentery included 20 per cent of mild 22 per cent of moderate and 2 per cent of severe cases and their average stay in hospital was 20 days. Dysentery was treated as a clinical problem and no fetish was made of attempting to isolate dysentery bacilli but of a large number of isolations Flexner organisms formed 70 per cent Shiga 19 per cent Sonne 6 per cent and Schmitz 5 per cent. The recorded incidence of amoebic dysentery was only 1 per cent. Treatment of the bacillary infections consisted of strict rest in bed morphine for severe pain water only by mouth for 12 hours then a graduated bland diet until the stools were normal. Sulphonamide drugs were given in selected cases. Dehydration was rare and was corrected by transfusions of plasma or blood. Salts and castor oil were not used. Sixty three patients were treated with sulphanilamide but the results were poor. Sulphapyridine was used in ninety seven cases with results nearly as good as with sulphaguanidine but it produced severe nausea vomiting and malaise. Three hundred and six cases were treated with sulphaguanidine the routine suggested dosage being an initial dose of 6 gm followed by 3 gm every four hours until the stools were two to three daily and then 3 gm thrice daily for another two to three days. There were no subjective toxic effects but four cases of rubelliform rash about the tenth day and one of sulphaguanidine kidney with recovery occurred. With sulphaguanidine the dysenteric symptoms rapidly abate malaise disappears stools diminish in number and sigmoidoscopic examination confirms the resolution of the inflammatory process. Of 203 severe or moderate cases the average stay in hospital was 17 days and there were only two deaths in the series of patients treated with the drug.

Some 2 000 patients were admitted to hospital with a clinical picture that was closely similar namely pyrexia (often heralded by rigor)

severe headache, vomiting, and often pain on moving the eyes but with no physical signs beyond (frequently) splenomegaly and pink eye. Of these 735 had malaria and 19 had relapsing fever. In 1153 cases the patients recovered in a few days and it was considered that 805 of them had sandfly fever while in 348 the diagnosis remained quite obscure. Of the malaria infections 81 per cent were benign tertian, 6 per cent malignant tertian, 1 per cent quartan while 11 per cent were diagnosed as clinical malaria. The standard Army treatment was used and the relapse rate was low.

Among 10 000 prisoners of war the occurrence of scurvy led to a modification of the diet by which the vegetables were increased at the expense of the meat. This was followed by an outbreak of diarrhoea and in a fatal case the question of pellagra was raised. Examination then revealed over 1 000 cases of pellagra of which about 200 were moderately severe and 31 severe. They were treated with nicotinic acid and the addition of milk, peanuts and meat to the diet.

A few cases of beriberi occurred in the long distance desert group and in the besieged Tobruk garrison. There were 19 cases of relapsing fever which appeared to be tick borne. Spirochaetes were scanty, neurological complications included lymphocytic meningitis and cranial or other nerve palsies and the disease was resistant to most drugs though the author thought stovarsol was effective. Schistosomiasis occurred in 18 patients and kala azar was found in six. No case of heat hyperpyrexia was seen but there was one fatal case of heat exhaustion in a soldier landed from the Red Sea during a heat wave.

In the discussion following this paper the CHAIRMAN (Sir Harold Scott) pointed out that in previous wars the ratio of medical to surgical cases was 10 or more to 1. In the South African War he had seen wonderful results with concentrated solutions of magnesium sulphate in dysentery, the stool being reduced to three or four within 24 to 48 hours. Lieutenant Colonel BARBER mentioned that the value of the ordinary topical prophylaxis of heat stroke was negligible. Sir Philip MANSON BAHRF called his experiences with dysentery in the last war. He endorsed the efficacy of sulphaguanidine treatment and wished that the claims of bacteriophage could be finally confounded. He suggested that many of the pyrexias of undetermined origin might be due to subtertian malaria and enquired whether rectal puncture had been found of any value in diagnosis. Air Commodore MORTON referred to desert sores and their occasional association with diphtheria infection. Dr STANUS thought that the failure to prevent dysentery in a stationary camp and pellagra in a Libyan internment camp was of great significance and he asked for information regarding the method of transmission of the dysentery. Brigadier MACDONALD thought it important that military medical officers should receive a basic training for overseas duty in the United Kingdom and that this should be supplemented abroad by instruction in the locally important diseases and their control. He asked that judgment should be reserved on the apparent failure to control dysentery as figures would probably show later that the incidence of disease was in fact much lower than in previous campaigns. Dr FELIX drew attention to the treatment of typhoid with anti-typhoid Vi+O serum. Professor Buxton had found that house flies were rare even in kitchens and messes in the Middle East and he did not believe the dysentery was fly borne. Colonel Boyd said that amongst 60 000 cases of dysentery the incidence of amoebic dysentery was less than 5 per cent and that of the dysentery

bacilli isolated Shiga formed 20 per cent. The effect of anti dysenteric serum is short lived but—given together with sulphaguanidine—it is valuable in acute toxic cases. There was no evidence that bacteriophage had any prophylactic value against dysentery and there was no statistically significant difference between the results of bacteriophage and ordinary saline treatment. *F Murgatroyd*

MURRAY LYON R M Important Diseases affecting West African Native Troops *Trans Roy Soc Trop Med & Hyg*, 1944 Mar v 37 No 5 287-96 Discussion 296-302 [LOW G C CHESTER MAN C C MANSON BARR P HAWLS R B STANNUS H S CAMERON I G BOMFORD F L FELIX A SCOTT H H (President) MURRAY LYON R M (in reply)]

This survey is based upon experience among native African soldiers drawn from all parts of the West Coast of Africa. A high proportion of the patients suffered from non tropical respiratory diseases which accounted for almost a third of all the medical admissions to hospital. pneumonia rapidly responded to sulphapyridine the death rate was low and complications rare. Other important non tropical conditions were chickenpox cerebrospinal fever and vaccinia. The chickenpox was usually mild but there was a number of very severe cases. in the latter the distribution of the rash was more that of smallpox with maximum lesions on the face and periphery of the limbs although lesions were always present on the trunk. When chickenpox attacked patients already under treatment for trypanosomiasis there was rapid deterioration in their condition shown both clinically and by an increase in cells and protein in the cerebrospinal fluid. Cerebro spinal fever was frequently fulminating in its onset but the majority of cases responded well to sulphapyridine. many of the patients at no time showed typical clinical signs so that it became a routine to examine the cerebro spinal fluid of all acutely ill patients not showing definite localizing signs of other diseases.

The vast majority of African soldiers were found on admission to hospital to have several tropical infections and it was sometimes difficult to decide what was the actual reason for reporting sick. Helminth infections being practically universal had to be ignored unless the infestation was heavy and giving rise to very definite signs and symptoms. Patients suffering from trypanosomiasis were usually admitted to hospital because of cervical adenitis increasing lethargy persistent headaches or falling off in efficiency which was often first noticed by their officers. Diagnosis was made by gland puncture trypanosomes being rarely found in the peripheral blood and about half the patients had changes in the cerebrospinal fluid. Routine treatment from which no toxic effects were observed consisted of four doses of 1 gm of antrypol at 5 day intervals followed by a course of tryparsamide in 2 gm doses up to a total of about 24 gm. Tropical myositis was chiefly seen in natives of the Cameroons and eastern provinces of Nigeria. the causal factor was not determined and sulphonamide drugs did not appear to influence the course of the condition.

Dyspnoea weakness and oedema were the most prominent manifestations of vitamin B deficiency and occurred chiefly in new recruits enlisted from up country bush villages being rare among men on army rations. there was no appreciable albuminuria in these cases.

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the blood pressure was low and there was tachycardia with cardiac enlargement while diminished deep reflexes hyperaesthesia of the calf muscles and hypoaesthesia over the shins were also found. Other evidences of vitamin deficiency included angular stomatitis thickening of the scrotal skin crazy pavement skin over the dorsum of the foot and anterior aspect of the leg and atrophic glossitis. Treatment consisted of rest in bed adequate diet and large doses of marmite. The sickle cell trait was found in the blood of 20 per cent of all patients examined but in only a few were there any symptoms or disability and any anaemia present was usually due to some other cause such as hookworm disease malaria yaws or nutritional deficiencies. Thrombosis in sicklaemia might lead to symptoms such as cerebral lesions. Malaria peptic ulcer acute osteomyelitis as well as cerebral lesions. Malaria produced little sickness in the Africans except on moving from one colony to another when a certain proportion developed acute attacks the symptoms frequently subsided spontaneously or after a few days treatment and no case of blackwater fever was seen among Africans. Dysentery was second only to respiratory diseases in its incidence and bacillary infections were approximately twice as common as amoebic infection as found. Bacillary dysentery was treated with sodium sulphate or if the patient was severely ill with sulphapyridine sulphaguanidine or succinylsulphathiazole. Amoebic dysentery was treated with a course of ten daily injections of 1 grain emetine hydrochloride daily for one gram of emetine bismuth iodide and 6 grams stovarsol daily for one week. It is recorded that there were numerous cases of dysentery due to *Balanidium coli* which cleared up satisfactorily when treated with sodium sulphate in the usual doses as after treatment with worm infestation anthelmintics as it was discontinued after treatment the use of carbon tetrachloride was discontinued. Liver disease appeared to be very common in the African natives it was unusual to find a normal healthy liver at autopsy whatever of cirrhotic changes even in patients under 30 years of age. [The exact pathology of these liver changes and their possible relation to dietary deficiency would be worth studying.] Yaws was a major cause of disability and large numbers of the native troops had bone and joint or skin lesions. Murine typhus was not uncommon a rash was not typically seen and some patients had diarrhoea suggesting typhoid the pulse rate however was higher than in typhoid and agglutination tests showed no rise in the Widal response but a rising titre against *Proteus OX19*. The fever lasted about 10 days and the temperature then fell by lysis. All the patients recovered and treatment was but symptomatic.

In the discussion which followed this paper CHESTERMAN stated that in 16 years experience he had never seen an empyema in an African native although before the introduction of sulphonamide drugs the mortality from pneumonia was very high. In view of the deterioration in patients suffering from trypanosomiasis when varicella supervened he wondered whether the varicella virus brought about some breakdown of the barriers allowing the trypanosomes to get through to the central nervous system. MANSOON BÄHR remarked on the rarity of jaundice in amoebic hepatitis in his experience he had seen it only twice and in both of these cases there was a suspicion that the patient

was also suffering from infective hepatitis. HAWES drew attention to the possible association of dietary deficiency and liver damage. Carbon tetrachloride appeared to be dangerous when the diet lacked calcium or first class protein. alcohol also increased the toxicity of the drug. STANNUS raised the question of schistosomiasis being a contributing factor in the production of carcinoma of the liver. CAMERON compared the high splenic and malaria parasite indices in West African natives with the low rates in the populations of Malaya where strict anti-malarial control had existed for many years. He had recently heard of two cases of blackwater fever in African natives and wondered whether treatment of malaria might not break down immunity and possibly make blackwater fever more common in the future among the natives. BOMFORD commented on the difficulty sometimes experienced in differentiating clinically between yaws and chickenpox. He mentioned that he had encountered cases of psychoneurosis in African natives and that a common symptom was hysterical paralysis of the right arm. The PRESIDENT raised the question whether the severe cases of chickenpox might not have been cases of alastrim. MURRAY LION (replying to several points raised in the discussion) said that syphilis was rare but other venereal diseases especially gonorrhoea were very common among the African soldiers. Jaundice was quite definitely seen with amoebic infections of the liver. No cases of enteric fever were seen in Africans or Europeans. With murine typhus the rising titre against *Proteus OX19* occurred late in some cases as late as the 21st and up to the 30th day the rise of titre varied from 1/200 to 1/1000. There were many cases of infective hepatitis in Europeans within three months of inoculation with two batches of yellow fever vaccine used in October 1942 and December 1942. *F. Murrayd*

HARRIS L. A Health Unit as Family Doctor and Health Adviser
South African Med J 1944 Feb 12 v 18 No 3 39-46

This account of a most interesting work [a note of which was recorded in this *Bulletin* 1942 v 39 892] brings out certain features of great importance. The health unit in question is established in the Polela district of Natal South Africa and is undergoing a process of growth and development. Its work is hampered by the lack of political development in the African population. There is no elected local council to represent the people. The chiefs have little authority and are often unaware of their communal responsibility. [This seems to be an important point. No doubt much can be done for such communities by the activities of Government departments but it seems unlikely that advances can be carried through to satisfactory completion unless a community spirit is engendered and organized. The tribal system with its chiefs may not be able to achieve a proper sense of responsibility.] The only social unit with real community spirit is the family and the work of the health unit has been based therefore on the family. Most of the illnesses are infective or nutritional and usually implicate more than one member of a family.

The area is divided into four parts in each of which one health assistant works spending at least two working days each week there. The homes have been mapped, censuses taken, standards of education assessed and records have been made of housing, livestock and crops. Vital records and accounts of illnesses are kept and all persons attending the Polela Health Unit Clinic are registered on family index cards. Most of the school children have been examined.

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The vital records of a community of 887 persons for 1942 show a birth rate of 45 per 1 000 population and infant mortality rate corresponding to 2.5 per 1 000 live births [these rates are not of course claimed to be accurate because they provide some rough standard of assessment]. The high death rate is not due to any epidemic but some progress is being made in the sanitation is very primitive the author draws attention to the very construction of pit latrines the author draws attention to the very of animal and garden refuse has been introduced and will probably become more popular The health unit is attempting to combat malnutrition by a programme of garden improvement and the institution of measures to prevent soil erosion Lectures and demonstrations on gardening are held regularly seed is distributed and a model garden maintained at one of the schools

The housing problem is difficult and there can be little real advance until residential zoning is undertaken and village settlements are encouraged

Medical inspection is carried out by the medical officer who has had the opportunity of examining almost half the community within 18 months. Two of the chief diseases are syphilis and typhoid. For the former the author reports some progress in that many of the women and children are willing to undertake treatment courses of considerable length though men do not attend so well. Immunization against typhoid has been applied with some success as an especially in women and children

In a discussion of the health service the author calculates that a doctor is needed for every 4 000 of such a population but that with proper assistance and under conditions of overwork he could supervise 8 000

This is a stimulating paper and the principles on which the unit is conducted appear to be very sound. For a satisfactory health service it will be necessary for the Africans themselves gradually to assume more responsibility and there is evidently scope in these organizations for African medical men

Charles Wilcocks

1. PARRAN T Public Health Implications of Tropical and Imported Diseases Strategy against the Global Spread of Disease *Amer J Pub Health* 1944 Jan 34 No 1 1-6
2. SAWYER W A Public Health Implications of Tropical and Imported Diseases Yellow Fever and Typhus and the Possibility of their Introduction into the United States *Ibid* 7-14 [20 refs]
3. MCCOY O R Public Health Implications of Tropical and Imported Diseases Imported Malaria *Ibid* 15-19 1 fig
4. MELENEY H E Public Health Implications of Tropical and Imported Diseases Public Health Aspects of certain other Diseases to which our Military Forces may be exposed *Ibid* 20-26 [11 refs]

These papers are general statements of facts well known to medical men with tropical experience who have studied the effects of war on the spread of disease and of the spread of disease on war. It is well that such authoritative declarations should be recorded and the subject matter so well presented in these papers would form admirable preliminary lectures to medical officers proceeding overseas on war duties

The first paper deals with the widest aspect the remainder have a greater interest for medical men in the United States who may have to consider and perhaps cope with diseases brought back by returning troops

i PARRAN goes over the preliminary ground of the extent to which disease may be expected in military forces operating in the tropics and the broad outlines of protection of the troops and of the peoples of the world in the face of modern transport facilities This lecture could with great advantage be delivered to non medical commanders in the field it sets out the aims of the medical departments clearly

ii SAWYER deals particularly with yellow fever and typhus especially emphasizing the danger of the former to the peoples of the far east

iii MCCOY writes of malaria The problem is well enough known in troops in the endemic areas but he lays special stress on the likelihood of returning troops bringing their infections with them relapsing and originating outbreaks in non endemic areas

iv MFLINEY discusses cholera present in the people of the far east a menace to the troops there but unlikely to be introduced effectively into the United States dengue and sandfly fever sleeping sickness (pointing out that tsetse have been found in aircraft reaching Brazil from Africa) and some of the helminthic diseases Returning soldiers may introduce schistosomes which may find intermediate hosts indigenous to the United States though these are not known at present Bacillary dysentery amoebiasis typhoid and coccidioidomycosis are also discussed

The symposium contains no new facts but when so many medical men are entering a strange field of disease it is desirable that plain broad outlines such as these be set before them in a proper perspective

Charles H Wilcocks

HUDSON E H *Tropical Medicine its Scope and Present Status* Reprinted from *Scientific Monthly* 1944 Jan v 58 42-8

DEVINE J *A Note on Desert Sores* *Med J Australia* 1943 Oct 2 v 2 No 14 261-2 1 fig

Three types of desert sore have been recognized —(1) That in which a small blister appears which later breaks down This type was rare in Tobruk (2) Post traumatic arising from a scratch or abrasion (3) Resulting from a skin infection usually a boil

Whatever the origin these ulcers if neglected show little tendency to heal The author discusses the reasons for this The bacterial flora is so varied that no one organism has been satisfactorily incriminated in Tobruk deficiency of vitamins B and C was not probable LOUW [this *Bulletin* 1942 v 39 485] has noted that ulcers are rare in transport drivers and has suggested that the reason is that their skins are kept supple by oil Devine however takes the view that sweat acts as an irritant which prevents healing and that transport drivers do not normally perform work which leads to heavy sweating and that their skins are kept dry by the movement of air The heaviest incidence of ulcers in Tobruk was in men from field bakeries who worked in conditions of great heat and in the actual fighting men who in the front line sweltered in unsheltered holes and in the back areas undertook heavy physical work The quartermaster's staff never seemed to appear on sick parades with desert sores

and blood inhabiting protozoa chapter 6 ending with a note by Dr TALIAFERRO on the reactions of the human host to malaria—a master piece of condensation Chapter 7 deals with the mosquitoes which transmit disease and the methods of distinguishing Anopheline and Culicine in their larval and adult stages and concludes with a key intended for the identification of a few species together with an admirable account of how to use it and some simple exercises Chapter 8 to which a key is like wise provided refers to the Ceratopogonidae the Simuliidae the Psychodidae and the Tabanidae the genera Glossina and Stomoxys and a number of non biting flies of medical importance In each case the pathogenic importance of the fly is described but it is doubtful whether the descriptions and illustrations are sufficiently detailed to allow of identification Chapters 9 and 10 which together occupy only seven pages describe the fleas lice bugs ticks and mites the same general arrangement being observed as with the other Arthropods Chapter 11 is the longest in the book and the information which it contains although compressed is surprisingly detailed thus under Biopsy are considered liver and splenic puncture sternal puncture gland puncture muscle biopsy The book is strongly bound and well printed and comprehensive index The book is certainly not excessive and the price (9s) is certainly not Professor Huff does not imply that the teaching of parasitology and tropical medicine should come before as opposed to after graduation What he does suggest—and with this most teachers of medical parasitology will agree—is that it is highly improper to let the medical student pass from the University to public life without giving him at least an outline of these subjects so that he will later realize that there is a vast field of medicine concerning which he has no satisfactory knowledge This suggestion at once raises the question of how extensive an outline should be given to the student before graduation That some of it can be taught during his first courses of biology is certain but the field at this stage is limited and the bulk of the work will devolve on the final years of import already referred to the fact that Dr Huff omits no parasite with at once in human disease and an examination of the table of contents shows that the names of 10 of the flukes 10 of the cestodes 15 of the round worms and no less than 25 of the protozoa to say nothing of the insects and ticks concerned with their transmission truly a formidable list Whether the American student in his final years is really acquainted with these parasites we do not know but we feel sure that the vast majority of the names mentioned mean little or nothing to the British medical student of the same standing in spite of the fact that once qualified the British student is more likely to encounter the parasites and the diseases which they produce than is his American colleague

The reviewer has dealt with this book in some detail because he is of opinion that it represents an important addition to the literature in that it is the first attempt to provide a manual of parasitology suitable for the medical student during his undergraduate career

R M Gordon

TROPICAL DISEASES BULLETIN

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MEDICAL ORGANIZATION AND DISEASES OF BURMA

BEFORE THE JAPANESE INVASION *

By Charles WILCOCKS M D M R C P D T M S H S

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Burma is a country of over 14½ million inhabitants of diverse races largely Burmese but with Karens Thais and Indians represented in very considerable numbers. The country is divided into 40 districts.

The medical organization comprises —(1) the Public Health Service with a Director and two Assistants and a staff of 40 doctors employed exclusively for this work and 24 part time and (2) the curative service the Inspector General of which controls the activities of about 300 hospitals and dispensaries of various sizes. In all there are about 474 qualified medical men in Government service Europeans Indians and Burmese in addition to those employed by mission organizations there are 509 nurses male and female 220 midwives 305 compounders 63 public health inspectors and 392 vaccinators. At Rangoon there is a full time port health staff which maintains a good disinfection station for immigrants at Hlegu a rural health unit maintained by the Rockefeller Foundation and there are 43 infant welfare societies.

Laboratory services are provided at the Harcourt Butler Institute of Public Health Rangoon the Pasteur Institute Rangoon and at the district laboratories attached to all the important hospitals throughout the country though many of these are equipped only for routine work. X ray facilities are available at Akab Syriam Pegu Bassein Tavoy Taunggyi Mergui Toungoo Mandalay Maymyo and Rangoon General Hospital.

A list of the larger hospitals is included as an appendix to this report but it may here be remarked that the Rangoon General Hospital is fully equipped for all modern medical work and is a hospital at which the teaching of medical students has been carried out. The Mandalay General Hospital is comparable with it in equipment though not in size.

In the next four issues of the *Tropical Diseases Bulletin* the following countries will be dealt with in the same manner —The Andaman and Nicobar Islands Thailand Indo-China the Netherlands East Indies

At the Government Medical College Rangoon local students are taken to the degree standard of MB BS and about nine pass the final examination each year. At the Government Medical School Rangoon a shorter course (of four years) is given and about 35 licences to practice are issued each year. Nurses and midwives are trained at Rangoon and other places.

NUTRITION AND NUTRITIONAL DISEASES

Aliments.—The diet of the Burmese is usually generous and varied. Rice is much eaten and in the rural areas is hand pounded and by this process the whole grain retains much of its outer layers and the embryonic portion which contains the vitamins essential to good health. In the towns however there is a tendency to use rice milled by mechanical means—but not completely as the polished rice which has little of the protein lost its vitamins. Beans and fresh vegetables are generally available meat is taken in small quantity only but fresh fish largely consumed here it is available. Cattle and pigs are kept for their meat and milk but not consumed much by the Burmese though there has recently been an increase in the use of dried and tinned milk. Ghee is a common food. Fruits are plentiful and one especially gyink about which is known to be rich in vitamin C. Indian coolies too frequently subsist on a poor diet of rice to the exclusion of other better foods. These are often stored in rice mill and during the rains tend to become mouldy. Sugar is frequently milled and in this process the vitamin bearing layers are lost and the friable with moisture are removed so that the final product is equivalent to polished rice containing no vitamin.

Although the diet in the whole country is fairly good it is noted that malnourishment of children is found in 6-24 per cent in certain districts. Vitamin deficiencies also occur principally deficiencies in vitamins A and B.

Beriberi.—Irom has been stated above it will be evident that the occurrence of beriberi in Burma is not uniform. It is uncommon in the rural Burma and is chiefly found in Indian coolies in whom it has a definite seasonal incidence reaching its height in October and probably connected with the effect of damp on rice mentioned above. It is also found in Telegu labourers in Thais and Malays and some Burmese who have been recorded in Mayauk Myaun. Outbreaks have been recorded in timber felling camps military police posts schools hospitals and hospitals. In these the individuals have been compelled to rely on rations stocked and probably deteriorated and consisting too exclusively of rice.

In 1939 3916 cases and 179 deaths were recorded. It is a disease of childhood usually associated with lack of sunlight and is some what rare in hot countries. Scurvy as reported 84 times in 1939. In a country where fruit is plentiful case of this disease should be rare.

Near Rangoon cases of *malnutrition oedema* are becoming more common. The cause of this condition is food deficient not so much in quantity as in quality especially deficient in protein. There is usually also hookworm infection and malaria.

Epidemic dropsy may be mentioned here though it is probably not a deficiency disease but a poisoning due to contamination of mustard oil (used for cooking) by the products of the plant *Argemone mexicana* which grows with the mustard. Outbreaks occur often in family groups or persons obtaining the contaminated oil from one source. It is an acute disease and may end fatally. It is often seen in Indians who make much use of this oil and has been found in persons using oil obtained from Calcutta. In 1921 there were 174 cases with 6 deaths in and around Rangoon and in 1935 there was another outbreak there. Epidemic dropsy is notifiable.

Goutre due to deficiency of iodine in water is widely prevalent in certain hilly localities especially the Meiktila district the Minbu area the north and south Shan states and Kachin in Upper Chindwin and Salween. It is most common in women and is not a serious condition.

WATER SANITATION INTestinal DISEASES

Water supplies—In the large towns water supplies are usually good for instance the deep tube wells of Rangoon provide bacteriologically satisfactory water especially in the dry season. This is frequently examined and is supplied to ships in the port. In addition Rangoon receives water from two lakes. In the rural areas water is obtained from the great rivers for instance the Irrawaddy but since these rivers are constantly used by boats their water is constantly fouled. Elsewhere shallow wells are made by the natives and storage tanks have been used for many centuries. These wells are grossly contaminated by the natives who have little understanding of the necessity for protection of the supplies. Wells tanks and streams receive surface rain water which especially after drought carries into them the surface contamination of the vicinity a matter of the greatest importance in a country subject to outbreaks of cholera.

For Europeans and bodies of troops or labourers the only safe rule is to make sure that all water supplied is thoroughly sterilized before issue. For large quantities chlorination is easy and safe for small quantities boiling is safe. Filtration by means of domestic filters is thoroughly unsafe and no such filters should be allowed. They give a false sense of security and may even add contamination to water.

Sanitation in towns is improving. The bucket system with daily removal is largely used but more permanent and safe methods are being introduced. In the country districts the natives defaecate indiscriminately but in some places pit latrines are used and the construction of very satisfactory bored hole latrines is encouraged by Government. But in the main the sanitary habits of the mass of the rural population are bad. It will be understood that diseases such as cholera fevers of the typhoid group and the dysenteries can easily under these conditions spread in epidemic fashion.

Cholera epidemics have occurred at least six times since the beginning of this century but the recent outbreaks have not been so extensive as those in the early years. The period from April to July is noted as that at which most cases occur. It is pointed out that wells and tanks are polluted after floods. This disease is particularly associated with the fairs held periodically at which there are large gatherings of natives. But the distribution of cases through the country is always scattered and the disease is rarely absent from all parts at once. The incidence is invariably higher in Lower than in Upper Burma and is especially

high in the delta. In 1934-35 there were outbreaks in Myaungmya Bassein Pyapon and Maubin in 1939 in Tharrawaddy Henzada Maubin Pyapon and Prome and deaths were numerous in the Pegu and Irrawaddy divisions.

In the main cholera is a water borne disease but it has been reported that true cholera organisms have been found in prawns caught at Rangoon the possibility of transmission on uncooked or insufficiently cooled food should not be overlooked and native grown vegetables should never be eaten rather the more so because human faeces are used for the fertilization of market gardens. Transmission by flies is also probable. Prevention is largely a matter of protection of water supplies and of safe sanitary methods but protective inoculation is used on a large scale throughout the country.

There were 1468 reported deaths from cholera in 1939 the actual number was no doubt higher.

Cholera has been one of the great problems among refugees in the Chinese Japanese area it may be expected in Burma if any refugee movement occur and its control under these conditions is most difficult.

Fetters of the typhoid group are common in 1939 there were 1896 cases with 184 deaths but there is little doubt that the actual incidence was greater than these figures suggest. Incidence has been noted as high in Allaungmye Taunggyi Yangoon Zikun and Namtu. These diseases are often relatively mild in the natives but are usually severe in un inoculated Europeans. It is thought that from long exposure to infections the natives have acquired some immunity against them.

Dysentery is exceedingly common. The bacillary form was responsible in 1939 for 24115 known cases with 189 deaths. On the other hand in one report it is stated that dysentery and diarrhoea caused 6431 deaths in that year. These diseases are at their maximum in July the highest rates are reported from Akyab Kyaukse Pyapon Kyaukpadaung and Meiktila but all districts are implicated. Bacillary dysentery is very severe in children and it is probable that this disease is responsible for a large part of the high infant mortality and that by no means all the cases are reported. The severe Shiga form has been found in military stations but the milder Flexner form is the more common and the Schmitz and Sonne varieties are also found. Amoebic causes much chronic ill health. In 1939 there were 13146 cases with 182 deaths. Both these diseases are very liable to affect Europeans. Dysentery has always been a major menace to armies and may be expected in the event of large scale movement of refugees.

INSECT BORNE DISEASES

Malaria is the commonest disease in Burma and may be expected in any part of the country though its intensity varies very widely in different areas. On the coast in the plains and round Rangoon it is not particularly prevalent but in the inland foot hill areas and round Lashio and the western end of the China Burma road it is intense especially after floods caused by heavy rain when it may become epidemic. It is prevalent in Upper Chin in especially at Kalembo Pantla Tamu the Kabaw valley Indaw and Homalin. It is endemic in the northern and southern Shan states and the incidence rate are high in Shwebo (especially Kyunhla) Prome (Padaung Shwedaung and

Thegon) Pyapon (especially the Pyindaye forest reserve area) Lower Chindwin (Karu Budalin Yinmabin and Pale) and elsewhere

The highest death rates for malaria are usually reported in winter especially in December regionally the highest death rates are found in Lashio Shwedung (where epidemics have occurred in recent cold seasons) Mawlaik Mergui Myanung and Myittha. The rate in Lashio has doubled in recent years but where antimalarial work has been done a considerable reduction has been effected. In 1939 there were reported 120 904 deaths from fevers in the whole country but these no doubt include some from causes other than malaria. Nevertheless there must be a large number of deaths from malaria especially in infancy which are not recorded.

In addition to the deaths it causes malaria is responsible for an enormous amount of ill health and it may be taken as true that in the greater part of the country every person suffers many attacks especially in childhood. In places where the incidence is largely seasonal these attacks may persist throughout life in places where the incidence is perennial immunity may be acquired in early life.

The common form of the disease is malignant tertian but in most places the benign tertian form is also seen for instance at Mawlaik in the cold season. Round the western end of the China Burma road malignant tertian malaria accounts for about 70 per cent of the cases benign tertian for about 26 per cent and quartan for the rest. On this road malaria has been so prevalent that it has constituted a major threat to the success of the undertaking it has caused serious incapacitation of the labourers engaged in building and maintaining the road and on the transport workers. Energetic measures however were taken to protect the labour camps and rest houses and considerable success was achieved.

In the mountain valleys and the foothills six species of *Anopheles* are important. *Anopheles hyrcanus* var *sinensis* breeds in open or grass covered stagnant water in swamps ponds lakes wells drains and ditches and in the water of rice fields. It is an important carrier. *A. jeythorpiensis* similarly breeds in rice fields in grassy river margins and drains it too is an effective carrier. *A. minimus* is the most dangerous species readily attacking man it breeds in the shaded water of the grassy edges of streams and drains and is ubiquitous in the mountains. *A. maculatus* another important vector breeds in the grassy edges of streams and drains and even in the unshaded quiet pools found in rocky streams and in seepages. This mosquito prefers water open to the sky. *A. culicifacies* breeds in canals pools in rocky stream furrows seepages road puddles and the borrow pits from which earth has been taken for engineering purposes and which become ponds in the rainy season. *A. annularis* breeds in swamps pools and rice fields and in tree holes. It may be found in forest pools.

It has recently been found that *A. leucosphyrus* is an important carrier in Assam. This species is also found in Burma Malay the Netherlands East Indies and the Philippines. It breeds in small collections of stagnant water in jungle country in springs and hoof marks and is responsible for malaria in forested areas. The adults are fairly often found in houses and attack man readily.

In the plains where malaria is not so prevalent and in coastal areas there is some breeding of species which favour rice fields pools and drains but these species are not usually such efficient carriers as those which choose stream water.

Nevertheless outbreaks do occur in these regions and one such 12 miles north of Rangoon was transmitted largely by *A. hyrcanus* var. *niterrimus* a swamp breeder. In this place *A. minimus*, *A. taeniorhynchus*, *A. bipunctatus* and *A. babingtoni* were also found but were regarded as of less importance. In the Arakan coast area the incidence of malaria is on the whole moderate but at the foot of the hills high spleen rates were found in children 38.9 per cent in Pauktu and Dotan and as much as 80.7 per cent in Kwingyi and Padeaw.

Antimalaria measures have been taken to prevent the breeding of anopheles species. At Lashio and along the China Burma road extensive control measures have been undertaken. These include the clearing of drains, draining of marshes and ponds, the oiling of collections of water of many kinds, the use of Paris green. These measures are vigorously applied especially near labour camp and rest houses and the general rule is that no mosquito breeding should be permitted within half a mile of such camps or rest houses.

Adult persons entering endemic areas and who have not acquired immunity suffer heavily from the disease and malaria is a major factor in the conduct of military campaigns. In large engineering works great care should be exercised either to recruit labour gangs locally in which case they are probably fairly immune or if they must be recruited from outside to protect them against mosquitoes. Drug prophylaxis is an important means of control in troops and labourers.

Malaria is now endemic in Burma in both towns and country districts and some thousands of deaths are reported every year. In 1939 there were 3,666 known deaths from this disease but the actual total is probably higher. About 10 per cent of the deaths are reported from towns especially from Rangoon and the towns on the main lines of communication by river or rail. Along these routes the infection is highly no doubt carried in merchandise. Endemic areas are Moulmein (especially the town of Mahlaing), the town of Pyawbwe, the northern Shan states (where at the village of Namkham there was recently an outbreak of pneumonic plague). A similar pneumonic outbreak was reported from Padigon in the district of Pegu. Plague is also found in the Myingyan district (at Natogyi, Shwebo and Namthun), at Mawmyi and in the district of Sagaing. At Shwebo it is noted that the bazaar is the spot in which the cases occur and this is true of other towns.

In some of these places it is known that by no means all the cases are reported.

Plague shows seasonal variations in incidence. The highest numbers of deaths usually occur in the season November-April and in Lower Burma there may be a secondary rise in July.

Rats are found in large numbers in Rangoon which like all other ports is infested with these pests. They abound in the storehouses and godowns and in the rice mills where a plentiful supply of food is available. Suitable building arrangements can be effective in preventing the entry of rats into stores but many of the existing buildings have not been made rat proof. On the lines of communication stores and ships are infested and ship and river craft usually carry them. Rats and the fleas are carried in bags of grain or in bales of cotton.

In human plague rats are important in proportion to their nearness to man and different species vary in their habits and therefore in their importance to man. In Rangoon and elsewhere in Burma *Rattus concolor*, *P. r. s.* and *R. noronhai* are the prominent species in this connexion.

The two former are closely akin and are domestic in their habits. They inhabit houses and stores they are climbing rats. *R. rattus* is present but *R. concolor* is the more common. *R. norvegicus* the brown rat is rather a field or sewer dweller than a domestic species and is less in contact with man and therefore of less importance.

Of the fleas *Xenopsylla cheopis* is the most effective carrier and is responsible for most human cases but in some parts of Burma *X. astia* is more commonly found on the animals. This flea will transmit the disease to man but not nearly so readily as *X. cheopis*.

Preventive measures are taken to keep the rat population down in ports by the fumigation of ship and the prevention of transit of rats between ships and the shore and by the rat proofing of stores and godowns. Inland attempts are made to prevent rat breeding in buildings but as yet such measures have been but scantily applied and it is indeed an enormous task to render native bazars rat free. Preventive inoculation is practised on a considerable scale and in 1939 over 10 000 persons were so inoculated.

Typhus is probably more common in Burma than has been suspected and though definite information is scanty there are probably four forms. The louse borne type transmitted from man to man by the louse was reported in 56 cases in 1929. The murine type or shop typhus transmitted from rat to man by the rat flea occurs in many eastern ports and is probably to be found in Burma. It is reported that a tick borne form occurs inland and serological tests indicate that the mite borne form similar to the scrub typhus of Malaya and to tsutsugamushi disease is to be found in the country districts where the mites live in the scrub. In 1935-635 cases of typhus the vector of which was not known were reported in addition to cases of louse and tick borne typhus some of these no doubt were mite borne.

Of these forms of typhus the most serious is the louse borne type which has broken out in recent years in large numbers of refugees from the war in China and which might break out under similar conditions in Burma. It is a disease of high mortality and is particularly associated with conditions of poverty and overcrowding of insanitary peoples in whom louse infestation is prevalent. The other forms are less severe and are much less likely to occur in epidemics though there is good reason to believe that the murine type which is usually found in isolated cases in rat infested houses may be transmitted from man to man by the louse and may therefore behave as in Shanghai like the true louse borne form.

No information is available as to the ticks which may transmit typhus in Burma but it is known that the common dog tick *Rhipicephalus sanguineus* incriminated in the transmission of this form of typhus in the Mediterranean area and elsewhere is found in Burma.

It has recently been pointed out that typhus has been found in the course of routine serum examinations of patients suffering from fever who would in the absence of these examinations have been diagnosed as cases of typhoid fever or of pyrexia of unknown origin and as the vast majority of such patients are not as yet investigated serologically there may be many cases of typhus which are not recognized.

It may be noted that the cases definitely diagnosed by blood examination in a recent investigation were from scattered areas in both Upper and Lower Burma and that cases of mite borne and flea borne disease were found indiscriminately in both urban and rural

areas. In military operations the possibility of the mite borne form in troop operating in jungle country should be borne in mind.

Dengue may be important because of the temporary incapacity it may inflict on bodies of troop. It is endemic in the neighbourhood of Rangoon especially during the rainy season from April to September and elsewhere. It is transmitted from man to man by *Aedes aegypti* throughout the coastal districts and in some inland parts.

Kala-azar is found but in small numbers. It should be borne in mind as a possible cause of prolonged fever. Sandfly fever may cause much ill health in Europeans.

OTHER DISEASES

Of the *helminthic* diseases *hookworm* infection is the most widespread and the most important but its distribution is not even. In the delta region and along the coast it is moderately severe and in those Indians who do not use latrines the infestation may be heavier than anywhere in Bengal or Assam. In the dry central zone of the country there is practically no hookworm and the inhabitants of the Shan states are but lightly affected. Hookworm infection tends to be high in estate labourers if sanitary conditions are poor.

Ascaris infection is common. Over a quarter of a million cases were reported in 1939. *Ascaris* infection is a reflection of the state of public sanitation.

Siliasis is not rare. *Guinea worm* infection is occasionally seen.

Tapeworm infection is fairly common.

Ulcers of the legs are exceedingly common, are often extensive and may lead to great destruction of tissue and permanent disability and usually remain foul and discharging for months. They frequently arise from small injuries such as abrasions of the skin acquired for instance in walking through bush country and are often found in labour gangs. They are particularly associated with conditions of inadequate nutrition. These ulcers may play havoc with labourers engaged on engineering work and the step for their prevention should include supervision of diet and prompt attention to all wounds however trivial. Over a quarter of a million cases were treated in 1939.

Syphilis is very common. In 1939 there were 39,791 reported cases. It is one of the most serious problems of the country and is widely spread. It is probably responsible for much of the infant mortality. *Gonorrhoea* is equally prevalent and *soft sore* and other venereal affections have high incidence.

Leprosy is commoner in Burma than in most other hot countries and there is reason to believe that the Burmese have less resistance to it than the Indians. Certainly the more acute and infective form is more often seen in Burma than in India. In 1939 there were 11,599 reported cases. Surveys have shown that the incidence varies from 0.16 to 5.0 per cent of the population and in contacts the rates may be much greater. The highest rates are found in the central belt from the Arrakan hills to the Shan States and here the acute form is especially common.

Leper colonies exist at Monywa, Minbu, Keng-tung, Meiktila, Sale Magwe, Siwebo and Nyaung-un.

Tuberculosis is even more serious than leprosy. Deaths are recorded only in the towns and in 1939 there were 2,766 deaths, the great

majority of which were due to tuberculosis of the lungs. It is stated that in Rangoon the death rate is four times as high as that found in England and that the risk of exposure to infection is equal to that experienced in England. Infection is reported to be very low in Upper Burma, low in Lower Burma and high only in Rangoon, but high death rates are recorded from other towns—Myitkya, Myaungmya and Mergui. There is a special dispensary for tuberculosis in Rangoon.

There were 6 692 cases and 887 deaths from *pneumonia* reported in 1939, but there is little doubt that the actual deaths far exceeded this figure. It is a common and fatal disease in the Far East and little can be done to prevent it. Troops on military operations and gangs of labourers may be expected to suffer severely on account of the exposure they undergo. Respiratory diseases are reported to be exceptionally prevalent in Lower Chindwin. *Influenza* is usually seen sporadically but may break out in epidemic form. 48 555 cases were reported in 1939. *Measles* and *diphtheria* are seen usually in children.

Cerebrospinal meningitis may be met and although comparatively few cases are reported each year, this is a disease associated with overcrowding which may spread widely in labourers and troops. There is a record of over 17 000 cases of *rheumatic fever* in 1939, but no details have been seen. *Smallpox* has not recently been reported in any great outbreaks, vaccination is widely performed but there is always a risk of introduction from abroad and spread in the still unvaccinated peoples of both town and country areas. *Unspecified fevers* account for almost 100 000 cases each year, these may include malaria, influenza, dengue, sandfly fever, leptospirosis or relapsing fever, cases of which are reported independently.

Tetanus is seen and should be remembered especially in connexion with war wounds. A few cases of *rabies* are usually reported but a large number of treatments are given each year in suspected cases.

Eye diseases are common, *conjunctivitis* is the most frequent and may be troublesome but *trachoma* is more serious. Gonorrhoea is responsible for some of the cases of blindness in the natives and *xerophthalmia*, a condition due to deficiency of vitamin A, should be remembered.

Snakes—The common poisonous snakes of Burma include the krait (*Bungarus fasciatus*), the cobra (*Naja naja*) and the king cobra (*Naja hannah*). These are members of the cobra family and their venoms are poisonous chiefly by their action on the nervous system. The vipers include the daboia (*Vipera russelli*) and the common green viper or bamboo snake (*Trimeresurus gramineus*). These produce intense necrotic reactions at the site of the bite but whereas the daboia is deadly the bite of the green viper is rarely fatal. Snake bite is common in Burma.

For troops and labour gangs the most common medical problems are those concerned with malaria, cholera, typhoid, dysentery, venereal disease, dengue, sandfly fever, hookworm infection and respiratory diseases, but it is of the greatest importance that the diet of these men should be adequate, not only in quantity but also in vitamin content. The most scrupulous care of water and food supplies to prevent intestinal disease due to contamination is essential. For the prevention of malaria experts should be consulted but prevention by means of regular quinine or mepacrine administration should not be overlooked.

NO PITATS

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 W F T P S n T e r r e s t r i a l S a k e s f o B r i t I n d i a D m n n s
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 W R S R C & J M I M J Ga 1937 v 67 p 446

SUMMARY OF RECENT ABSTRACTS *

VII HELMINTHIASIS

Trematodes

MARILL *et al* (p 466) have examined the nomad workers who come from the Saharan side of the Great Atlas Range to work temporarily in Algeria and elsewhere. There seems to be a vast focus of *Schistosoma haematobium* infection on the Saharan side of the Great Atlas Range where the snail hosts are abundant but most of the men who are passing eggs claim to be in good health. These transient workers are a danger to the people of Algeria where snail hosts are to be found and the authors discuss various measures which might be taken to prevent spread of the disease. The same authors (p 467) describe conditions in part of the Department of Oran where *S. haematobium* infection was found in 1935 after the institution of an irrigation system in the district. They give a list of the snails found in the area and go on to indicate the means by which snails could be destroyed in the irrigation canals. They also advocate strict control of Moroccan immigrant workers prohibition of bathing in the canals improvement of sanitary facilities and other measures.

BARNEOUD and GAUD (p 469) have confirmed the work of MARILL *et al* (above) that there is heavy infestation with *S. haematobium* in the Tafilalet region of Morocco. They found in boys aged 7-15 infestation rates up to 80 per cent the high rates occurring where there is abundant water from irrigation works. This focus is probably old and is part of a vast endemic area which includes all the palm groves south of the Atlas it is probably from this area that the other Moroccan foci have originated. There are other foci in Tunisia and in the Algerian Sahara.

MARTÍN SÁNCHEZ (p 848) describes what is claimed to be the first case of infection with *S. haematobium* to be recorded from the Canary Islands.

CAMPBELL BEGG (p 550) shows that urinary schistosomiasis is frequently overlooked in South Africa though it is in fact the commonest cause of right inguinal pain in that country. He notes that a first infection may fail to cause symptoms that a patient may be infected without eggs in the urine that eosinophilia is a valuable sign in recent infections and that cystoscopy is the only means of exclusion of the disease and the only valid test of cure. He points out that in the active stage of the disease there may be no urinary dysfunction and quotes cases to illustrate certain of the points made.

DOUMER (p 398) has conducted a survey of school children in Natal in which he found 10 per cent with active urinary bilharzia. Eggs of *Schistosoma haematobium* were found in the uncentrifuged deposit of the urine of 99 per cent of those children with haematuria at the time of examination. In most of the schools some children were passing blood in the stools and in one the eggs of *S. mansoni* were found in another those of *S. haematobium*.

DAVIS (p 251) has found infection [but whether with *S. laema tobiasi* or *S. nasais* is not stated] in 60 per cent of 2 000 persons examined in a part of Southern Rhodesia. He describes a characteristic facial appearance in infected children in which there is loss of subcutaneous fat in the region of the horizontal ramus of the mandible. This gives a triangular shape to the lower part of the face viewed from the front which differs markedly from the evenly rounded contour of the normal child.

GELFAND (p 398) remarks that in Southern Rhodesia bilharzia is next to malaria the commonest disease. He gives in detail the clinical features of infection with *S. mansoni* and makes the point that attention is concentrated too much on the local symptoms in the bowel or bladder and that the general constitutional symptoms are overlooked so that diagnosis is often missed if the local symptoms are absent or mild. Three types are observed. In the first there is a combination of fever, urticaria and eosinophilia. In the second the bowel symptoms predominate. In the third cirrhosis of the liver and splenomegaly are found and the condition favours the development of deficiency diseases and infections such as pneumonia and tuberculosis.

SCHWETZ and DARTEVELLE (p 249) note that bilharzia (*S. mansoni*) is common all over the eastern border of the Belgian Congo. The main source of the infection appears to be the rivers and creeks but the disease does not seem to be particularly prevalent in the fishermen of Lake Albert. Six species of *Plasmodium* are named and the authors think that most of them are capable of transmitting the infection. The only prophylactic measure at present possible is treatment of the patients. Referring to the high incidence in this region SCOPES (p 250) on the other hand attributes infection in large measure to the inhabitants' practice of wading in the muddy, stagnant lake water to fish and advocates the prohibition of fishing by infected persons.

ENGELHARDT (p 61) confirms the statement of KUNERT that intravenous injection of Bayer 205 promotes the production of eggs by *Schistosoma hematobium* in persons infected with this trematode. The drug therefore may be used for diagnosis in suspected cases in which the urine is persistently negative. A single injection of 1.0 gm. is satisfactory and eggs may be found within 18 hours—sometimes within 3 hours. This test may also be applied as a test of cure after a course of injections of antimony preparations.

MINING (p 63) discusses the complement fixation test in bilharzia for which he advocates as antigen alcoholic extracts of the digestive glands of infected snails. This test is useful in diagnosis and shows a marked group specificity within the genus *Schistosoma* but it has been shown in monkeys infected with *S. japonicum* that there is no relationship between the complement fixation titre and the degree of acquired immunity. Skin tests however are more valuable than complement fixation tests and with antigen prepared in the same way as *Trichella* antigen positive reactions may be obtained in persons infected with *S. haematobium* or *S. mansoni* after intradermal injections of the worm extract diluted up to 1 in 40 000. In normal controls there was no evidence of non-specific reactions.

CULBERTSON and ROSE (p 471) have used an antigen derived from the first distome *Potamonces dioplexus* for a skin test in the diagnosis of human schistosomiasis. They describe the preparation of the antigen from the flukes obtained from infected frog lungs. The effective fraction is water soluble and the ether and alcohol soluble portions

are less potent. Positive results were obtained in three infected human patients but not in 12 controls. The reactions were immediate and powerful and could be obtained even in a dilution of 1:200. It is probable that skin sensitivity may be maintained for two years after successful treatment.

KOPPISCH (p. 703) gives a description of the course of infection with *S. mansoni*. He notes that no planorbid snail of North America has yet been proved capable of acting as intermediate host but there is no certainty that none exists until an exhaustive survey is made. The differences observed between the infections seen in Porto Rico and in Egypt are probably explained by the much heavier infections acquired in Egypt.

MAGATH (p. 156) describes experiments which indicate that chlorination of water to the degree of 0.2 parts per million kills the cercariae of *Schistosoma mansoni* in 30 minutes with a safe margin. He also claims that rapid gravity sand filtration would render water safe [but WITENBERG and LORE this *Bulletin* 1938 v. 35:600 found that standard sand filtration will not hold back cercariae]. He points out that all streams in Porto Rico and Vieques should be regarded as contaminated because a very large proportion of the inhabitants are infected.

BRAUNE (p. 252) writes of two German preparations which can be relied upon to kill schistosome cercariae in water. One is a chloramine preparation, the other is calcium hypochlorite. Each is available in powder or tablet form. Acid augments the action of the former. The hypochlorite is more useful for large quantities of water. Neither would kill species of *Bulinus* or *Planorbis* even in relatively strong solutions but in the concentration sufficient to destroy cercariae these two preparations were also effective against bacteria. The author notes that the Sertiz filter layers in the German Army Knapsack Filter cannot be penetrated by cercariae.

LUTTER JOSEF (p. 849) discusses the methods which may be used to destroy the snail *Planorbis (Australorbis) glabratus*, the intermediate host of *S. mansoni* in Venezuela. Some of these snails have been found alive after two months in dry earth in the laboratory and the author considers that the drying of canals is of doubtful value, especially as in practice some water always remains in them. Reconstruction of the waterways could remedy this but it is useless to improve the canals so long as the rivers remain infested. Control of vegetation would render breeding more difficult but the author considers that treatment of the water is a more sensible and effective measure. Snails are killed by a 0.1 per cent solution of recently slaked lime within a day or less; their eggs are also killed and cercariae of *S. mansoni* are killed at half that strength within 15-60 minutes. The lime may be distributed by hand and in a canal used for experiment it was found that one lime treatment every three months was enough; this also considerably reduced the bacterial content of the water. Destruction of snails however is only part of the control measures to be taken which should include general sanitary improvements in which all sections of the population should cooperate.

CLASTRIER (p. 471) supports the contention of BARLOW that *Bulinus truncatus* withstands drying much longer than used to be thought possible. Barlow had found that it withstood winter drying of canals in Egypt for as long as 50 days and in Kordofan for seven months.

YARNWOOD and ELMES (p 704) report a case of paragonimiasis in an African in Nigeria who was accustomed to eat insufficiently cooked crabs and crayfish. In this case the lungs were not affected but eggs appeared characteristic of *Paragonimus* were found in a cyst deep in the muscle of the left scapula. No adult trematodes were found, but the cyst had been ruptured during the operation for removal. The patient also had homonymous hemianopia and it is suggested by the multiple lesions of the central nervous system had been caused by the flukes. BYRN (p 68) reports that *Paragonimus westermani* has been found in the lungs of an opossum in Tennessee. hitherto it has not been known that the opossum could act as host for this parasite.

DALLANE et al (p 47) describe in some detail the symptoms of three persons infected with *Fasciola hepatica* and diagnosed nine years after they had contracted the infection. In the first stage when the parasite first reaches the liver there are signs of hepatic disturbance with eosinophilia but without eggs in the faeces. When the fluke becomes adult in the biliary canals there may be more or less acute symptoms but these disappear when eggs appear in the faeces. The clinical signs are then those of biliary obstruction with a progressive and spontaneous decrease of the eosinophilia. The signs however are very variable as the histories of these three patients show. Carbon tetrachloride and emetine were given to one patient without evident benefit. MAZZOTTI (p 253) notes that cutaneous and intracutaneous tests with an antigen prepared from an extract of *Fasciola hepatica* gave positive results in a patient infected with that fluke but were negative in six with onchocerciasis and one infected with *Taenia saginata*.

CHEN and LI (p 847) have made a survey of the metazoan parasites of cats in China. Among the worms found were *Paragonimus* and *Fasciola hepatica* but *Clonorchis sinensis* was not seen.

LEBEN et al (p 61) refers to foci of human infection with *Opisthorchis felis* in the lower Dnieper (17 to 26 per cent infected) on the middle and upper Dnieper and in the Dniester and Desna basins. Infection was proved by animal experiments in the following fish — *Tineca*, *Cyprinus*, *Carassius auratus* and *Leuciscus idus*.

CHEN (p 254) describes the appearance and life history of *Ceratomyxus*, a heterophyid trematode parasite of rats and other animals in Hong Kong and elsewhere. Metacercarial cysts have been found in certain freshwater fish and frogs and if it can be shown that they infested the frogs (which is probable) they may be of public health importance since *Ceratomyxus* is transferable to men. It may have been overlooked in man since its eggs resemble those of common human flukes such as *Clonorchis sinensis*.

FERGUSON (p 974) refers to the rather remote possibility that cercariae of certain tritoid trematodes may penetrate the eyes of persons who bathe in lakes in Wisconsin, Michigan and Minnesota. There has been no actual record of such occurrence but the danger cannot be excluded.

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SCHEFFERS and WEINSTEIN (p 974) report three children (of one family) infected with *Diplostomum latum* in Florida which is not usually regarded as in the endemic area.

SAVORTZOV and TALYSIN (p 158) note a high rate of infection with *Diphyllobothrium minus* and *D. strictum* in the region of Lake Baikal. Three fishes and *Cyclops strenuus* are involved in the life cycle.

BONNE (p 553) noting that human sparganosis is rare in the Malay archipelago gives an account of recent research. Sparganosis is common in frogs and the adult worms are found in cats and dogs. Man may become infected by ingesting sparganæ or *Cyclops* containing fully developed procercoids. *Diphyllobothrium ranarum* is found in frogs and has been found in man.

In the diagnosis of *Taenia saginata* infection PODYAPOLSKIAYA (p 474) has found that examination of perianal scrapings or mere questioning of the patient is more accurate than examination of faeces.

PODYAPOLSKIAYA and KAMALOVA (p 474) have found that antigens prepared from cysticerci of cattle and pigs are unsuitable for allergic skin tests in human *Taenia* infections and in bovine cysticercosis. Positive results were given in uninfected persons and animals and a proportion of the infected failed to react.

GOTOR (p 65) discusses the diagnosis of cerebral cysticercosis laying emphasis on eosinophilia of the cerebrospinal fluid which if present is a strong diagnostic point. It is not however always present nor is eosinophilia in the blood. When eosinophilia is present radiographic confirmation of the calcified cysts is of great value. The complement fixation reaction is an important aid to diagnosis but should be considered in conjunction with the other signs.

Reporting on trials of various anthelmintics in the treatment of tapeworm infections (almost all *T. saevinata*) in India MUKERJI and MAPLESTONE (p 925) conclude that carbon tetrachloride is the drug of choice provided there are no contraindications to its use. With it they obtained 80 per cent of cures whereas with tetrachlorethylene the rate was 54 per cent and with hexyl resorcinol 47 per cent. Carbon tetrachloride was given in the morning on an empty stomach in doses up to 3 cc. A dose of salts was given either at the same time or 1½–3 hours later. The maximum dose (3 cc) cured 89 per cent of 27 cases in which it was given. The only toxic signs were drowsiness and giddiness which rapidly disappeared.

WOLFE (p 850) quotes figures to support his contention that hydatid disease is more common in Wales than elsewhere in Great Britain and discusses transmission and the clinical aspects of the disease.

LASNIER and CASSINELLI (p 614) elaborate the claim previously made by the first author that examination of the sputum stained with Beale's carmine will reveal small portions of hydatid wall in persons suffering from this infection. The chitin fragments stand out clearly and the polysaccharide of the hydatid membrane takes up the stain avidly. Large fragments can be seen by the naked eye but by this method minute fragments sufficient for diagnosis can be detected. The method is useful where a liver hydatid has ruptured into the lung or where the cyst has suppurated.

PIROSKY *et al* (p 474) have studied the antigens in hydatid fluid which can be used for intradermal tests in *Echinococcus* infection. The active fractions are a protein and a polysaccharide. Injection of each of which produces in infected persons a reaction marked by a central red papule, a zone of hyperaemia and a zone of oedema. The protein produces stronger and more lasting reactions than the polysaccharide. The authors conclude from their investigations that this is a true

antigen antibody reaction and to obtain the best results they use the antigen in the highest concentration which does not cause a reaction in uninfected persons.

CHANDLER (p. 705) has made an experimental study of the nutrition of *Hymenolepis diminuta* in rats by which he has established that the worm obtains most of its carbohydrate from the contents of the intestine of the host but can absorb nitrogenous substances and probably vitamins of the B group from the intestinal mucosa of the host. Elimination of protein from the diet of the host had no evident effect on the growth and reproduction of the worms but elimination of carbohydrate caused marked reduction and stunting. If these facts are true of other cestodes the common idea that tape worms produce their effects by robbing the host of its food and by producing toxins should be replaced by the view that they produce their effects on the nervous system and general physique by absorbing vitamins proteins and possibly hormones and other substances from the mucosa of the host. It is possible that *Dibyllobothrium* absorbs the intrinsic factor (which converts the extrinsic factor in meat and yeast into an anti-pernicious anemia factor) so that pernicious anemia results in individuals who have not enough of either the intrinsic or extrinsic factors.

LARSEN (p. 3) has investigated the transfer of passive immunity from mice infected with *Hymenolepis nana* var. *fraterna* to their young. He found evidence of such transfer partly while the young were *in utero* but more strongly through the ingestion of the mother's milk. The results support other evidence which indicates that immunity to parasites resembles immunity to bacteria and viruses. He (p. 801) reports that white mice infected with *Hymenolepis nana* var. *fraterna* elaborated specific agglutinating precipitating and complement fixing antibodies.

CHANDLER (p. 3-3) records from Texas the first known case of human infestation with the cestode *Mesocostoides variabilis* normally a parasite of fox skunks and other animals and of hares and ericetes. The life cycle is not fully known but the infection now reported was probably derived from the eating of improperly cooked flesh of a wild mammal or fowl. The patient a child of 13 months had a history of poor appetite abdominal pain and loss of weight; the worms were expelled after doses of oleoresin of *Aspidium*. Charles Walcott.

[To be continued]

MALARIA

PLATONOV, N. V. [Epidemiology of the Subtertian Malaria in the Novosibirsk Province] *Med. Parasit. & Parasitic Dis.* Moscow, 1942, v. 11, No. 5, 3-10. [In Russian.]

The predominant form of malaria in the Novosibirsk province of South Western Siberia is benign tertian. Although in some parts of the country subtertian malaria occurs fairly frequently, the majority of local physicians regard it as an imported disease. While this may be true for most districts, the author is convinced that in certain settlements situated in the flood plain of the river Obi the disease is endemic. Infections with *P. falciparum* occur regularly among the local population. This view is also supported by the meteorological

conditions in the affected areas. In these districts the mean summer temperature (above 19 C. lasting up to 43 days) the relative humidity and some other factors—such as cloudiness with its regulating effect upon the temperature—provide the optimum conditions for the development of the subtertian parasite in the anopheline mosquito and for its spread among the local population. In the territory in question subtertian malaria is endemic in the basin of the river Obi and its tributaries south of 56° 4' N. Lat. whereas to the north-east and west of this area only sporadic cases occur. C. A. Hoare

J. INDBERG. Le paludisme dans l'Iran [Malaria in Iran] *Acta Med Scandinavica* 1941 v 107 No 6 547-78 8 figs & 3 maps [Bibliography]

The paucity of published information concerning malaria in Iran endows with special interest any publication dealing with the subject. The present report contains an account of observations made and of information collected during two relatively brief visits to Iran. Unfortunately visits to neither the Caspian Provinces nor the Persian Gulf area, the two most malarious parts of the country, coincided with the malaria transmission season. In such circumstances the amount of information provided is remarkable; it is however inevitably fragmentary and difficult to summarize.

The provinces bordering the Caspian Sea, Gilan, Mazenderan and Gorgan, include the northern slopes of the Elbourz Mountains. The high mountains, denuded for the most part, afford pasturage and have a nomad population only. Malaria is not a problem here. Anopheles are not found at heights of 2,000 meters and over. In the ravines and valleys of the lower wooded mountains the scattered population suffers severely from malaria during the summer; the humidity is high. *A. superpictus* is a probable vector, but there is also a certain amount of rice cultivation, so some other species may be responsible. The plain, varying in width from 3 to 60 kilometres or more, contains the majority of towns and villages. Much of it is thickly wooded and there is an abundance of marsh and swamp fed by numerous rivers and streams and by abundant rainfall (1,500 mm in places). In some areas there are vast clearings where rice, tobacco, sugar cane, cotton, wheat and vegetables are cultivated. The presumed malaria vectors are *A. maculipennis*, *A. elutus* and *A. superpictus*. *A. pseudopictus*, *A. sinensis* and *A. bifurcatus* also occur. A large scale clearing of the bush, permitting more intensive cultivation, systematic drainage and the suppression of rice cultivation might make this a very prosperous area.

The localities most severely infested with malaria are in the west of Mazenderan; then come Gilan and the east of Mazenderan. The distribution appears to be patchy. Baboulser in east Mazenderan, for example, is almost free from malaria. The disease is most feebly endemic in the Gorgan province, which geographically is part of the Turkoman steppe. The transmission season appears to be from May or June to the end of September; the driest months are from April to August; the rainfall is abundant during the rest of the year.

Khouzistan is a large province in the south-west of Iran, the southern part of which is an extension of the Euphrates and Tigris basin, while the northern and eastern parts contain southern prolongations of the

high mountains of Louristan and of the central plateau. Malarial conditions differ widely in different parts of the province. Transmission is most active in May and June and in October and November, the latter being the more important. All three species of plasmodia occur, *P. falciparum* being most in evidence. Doctors of the Petroleum Company have reported the presence of 11 species of *Anopheles* in the area of their operations: *A. superpictus*, *A. stephensi*, *A. elutus*, *A. pulcherrimus*, *A. rhodesiensis*, *A. sergenti*, *A. apoc* (Marsh), *A. turkhud*, *A. hyrcanus* var. *nervosus*, *A. bifurcatus* and *A. algeriensis*.

In Bouchir, one of the three most important ports of Iran on the Persian Gulf, malaria is hyperendemic. A third of the patients treated in the hospital there in 1938 were suffering from malaria. The author found no adult anophelines during his visit in mid February, but he found *A. multicolor* breeding. This is the first report of this species from the Persian Gulf littoral.

Norman White

ZADEH A. Recherches sur le paludisme dans l'Iran. [Research on Malaria in Iran.] *Acta Med Scandinavica* 1941 v 107 No 6 579-83.

The author, formerly director of the Pasteur Institute of Teheran, reports briefly the results of observations made in 1934 and 1935 regarding malaria in three localities of Iran. In the neighbourhood of the Arak Salt Lake (Soultanabad) *A. maculipennis* and *A. superpictus* were found breeding in early summer. The spleen rates of five villages varied from 32 to 53. Parasites were found in 36 of 224 bloods examined: *P. falciparum* 16, *P. malariae* 17, *P. vivax* 1, mixed 2.

In the town of Khorramabad *A. maculipennis* and *A. superpictus* were identified. In the autumn the spleen rate of 286 children was 63.5 per cent and the parasite rate 30 per cent. Of the positive findings 50 per cent were *P. falciparum*, 10 per cent *P. malariae*, 8 per cent *P. vivax*, the remainder mixed.

In the Caspian provinces of Gorgan and Mazenderan *A. maculipennis* and *A. pseudosilis* were found breeding in ricefields in late spring. *A. superpictus* abounds in parts of Mazenderan. *A. hyrcanus* and *A. bifurcatus* were found but were not numerous. Spleen rates increased from east to west from 32 to 63 per cent and parasite rates from 5.7 to 20.9.

Norman White

REPUBLICA ARGENTINA. DEPARTAMENTO NACIONAL DE HIGIENE. Memoria de la direccion general de paludismo correspondiente al año 1942 [ALBERTO ALVARADO C.] [Argentine Report on the Year 1942 by the Director General of Malaria.] 59 mimeographed pp. 1 chart & 3 figs on 1 pl. 1943. Tucuman.

Much of the information contained in this administrative report is of little more than local interest. The author comments on the unsuitability of the calendar year as a period to be covered in a report destined to describe the evolution of malaria in a country in the southern hemisphere such as the Argentine. For example heavy rainfall in November and December may determine whether any given year is classed as an abnormally wet one but the effects of that rainfall only

become apparent in the early months of the following year April is the month of maximum malaria incidence in the Argentine July to June is the natural malaria year From June to October malaria transmission is in abeyance the temperatures are too low for the mosquito cycle of development of the parasite

Judging from the number of patients presenting themselves for treatment there was less malaria in 1942 than in any of the previous six years there was a 25 per cent decrease in 1942 as compared with the previous year The decline was shared by all six provinces in the endemic zone of the north east as well as by four of the five provinces in the Litoral zone Only in the Misiones territory between Paraguay and southern Brazil was there an increase There was no death attributed to malaria Malaria is a mild disease in the Argentine this applies to *P. falciparum* infections as well as to the much more prevalent *P. vivax* The frequency of parasites in 2943 positive blood slides was *P. vivax* 83.1 per cent *P. malariae* 9 per cent *P. falciparum* 6.8 per cent and mixed infections 1.1 per cent

Both oil and Paris green have been used as larvicides and a promising start has been made with the use of automatic flushing siphons Popular education as to the nature and prevention of malaria has engaged much attention

Norman White

BAUGÉ R. Associations paludéennes dans le nord et dans le sud de la Tunisie [Mixed Malaria Infections in the North and South of Tunisia] *Arch Inst Pasteur de Tunis* 1942 June 1-31 No 1-2 145-53 2 charts

Two years work in the examination of blood films one year in Souk el Arba in north Tunisia and one year in Tozeur in south Tunisia forms the basis of this account of the frequency of mixed malaria infections in the two regions As an introduction the author gives clinical notes of two unusual cases which show how severe and how resistant to treatment such mixed infections may be and how seriously underfeeding may affect the evolution of malaria infections

The first patient was admitted to hospital with the signs and symptoms of chronic malaria in a miserable condition *P. falciparum* and *P. vivax* were found in his blood He received the usual treatment which consists of quinine intramuscularly 7 gm given over a period of six days on the first five days of which 3 tablets of quinacrine [mepacrine] a day are given on the succeeding five days 3 tablets of premaline a day are administered [One tablet of premaline contains quinacrine 0.1 gm rhodoquine 0.005 gm and praequine (plasmoquine) 0.005 gm] Three weeks after the beginning of treatment the patient's condition had much improved Then the Ramadan fast supervened this the patient insisted on observing Sixteen days later a pernicious attack of malaria developed choleriform in type Schizonts and gametocytes of both *P. falciparum* and *P. vivax* were numerous in the blood For 48 hours the temperature was between 40 and 41 C In spite of energetic treatment the patient died

The second patient also had a *falciparum vivax* infection He too was very gravely ill but for the most part the temperature was very subnormal falling on one occasion to 35.8 C He received the same specific treatment as the previous patient which had however little or no

on blood and about equal numbers of the blood fed insects survived the 10-14 days to dissection. As a host *A. annulipes* was not inferior as far as percentage and intensity of gut and salivary fluid infections with *Plasmodium vivax* and *P. falciparum* were concerned. It is concluded that any deficiencies which *A. annulipes* shows as a vector of malaria in nature are not due to defects in its hospitability to the parasites. Until further evidence is forthcoming it would probably be wise not to concentrate large numbers of gametocyte carriers in areas where *A. annulipes* is abundant. W. A. L. David

EYLES D. E. & COX W. W. The Measurement of a Population of *Anopheles quadrimaculatus* Say. *J. National Malaria Soc. Tallahassee Fla.* 1943, 2, No. 2, 71-83, 3 figs.

Method of measuring population densities of mosquitoes are useful in giving information about the efficiency of control measures. The method employed was originally developed by F. C. LINCOLN in ornithological work and later applied and developed by C. H. N. JACKSON (this Bulletin 1937, 34, 59). R. A. FISHER and W. L. STEVENS for use with the tsetse fly (*Glossina morsitans*) and is based on the following principle. A random sample of individuals is marked and at some later time a random sample is caught from the area under study and examined. A certain number of marked individuals are recaptured. Then the proportion of recaptures to total taken ought to be the same as the proportion initially marked to the total population, i.e. population is equal to

$$\frac{\text{total marked} \times \text{total caught when recapturing}}{\text{recaptures}}$$

Three experiments along these lines were carried out near Reelfoot Lake, Tennessee over a four hundred acre tract of land. Catching was carried out at various points distributed over the area using the method described by EYLES (below). The insects were marked and released at 16 points near favourable resting places. From preliminary observations it was decided to make catches every three days. Full tables are given for the three experiments. They show that measured successively at two week intervals the populations were 5900, 000, 3000, 000 and 400,000 which represented from 8450-14750 females of the species per acre during July and August. The influence of possible sources of error such as that introduced by weighing instead of counting insects captured, excessive dispersal after first catch and uneven emergence of young adults are considered. W. A. L. David

EYLES D. E. A Method for Catching, Marking and Re-examining Large Numbers of *Anopheles quadrimaculatus* Say. *J. National Malaria Soc. Tallahassee Fla.* 1943, 2, No. 2, 85-91, 5 figs.

During the past two years the author has developed a technique for catching and where necessary marking very large numbers of *A. quadrimaculatus* (the important malaria vector species in the U.S.A.) in connexion with studies of flight range, dispersal and populations [see EYLES and COX above]. The apparatus comprises a vacuum cleaner unit with a 1/2 h.p. AC/DC motor and a long suction line. At the end of the suction line is the catching chamber which consists of a 6 1/2 inch diameter cylinder about 12-14 inches long divided into two by a

gauze screen which holds back the mosquito. To one end of this wide cylinder is attached the suction line while the other carries an extension in the form of a tube $3\frac{1}{2}$ in in diameter by 16 inches long. The apparatus is used much in the same way as a vacuum cleaner the insects are drawn in through the 16 inch tube and collect in the upper compartment of the wide cylinder. It is stated that 2-3 thousand mosquitoes can be caught at one time without injury. In order to avoid the tedious process of counting it is suggested that the container plus mosquitoes can be weighed and the weight of mosquitoes obtained by difference. On an average one gram of mosquitoes contains about 250-300 individuals. The method is thought to involve an error of under 20 per cent.

Marking the insects is carried out by spraying into the catching chamber fine aluminium or gold bronzing dusts. By comparison with untreated controls it was shown that this process does not harm the mosquitoes and that the results last up to 26 days. Examination of captured insects is most quickly carried out against a white background each insect being held momentarily in the beam of a microscope lamp. Marked individuals shine brightly. About 15-25 thousand insects can be examined in a day.

W A L David

KUMM H W & ZÚNIGA H Seasonal Variations in the Numbers of *Anopheles albimanus* and *A. pseudopunctipennis* caught in Stable Traps in Central America *Amer J Hyg* 1944 Jan v 39 No 1 8-15 3 figs

The object of this study was to determine which species of Central American *Anopheles* were most abundant at the time of the year when malaria was highest. Collections were made between the years 1938 and 1942 at various places in Costa Rica and El Salvador. The traps were baited with horses or mules. The results obtained in Costa Rica show that *A. albimanus* was much more abundant (9440 caught) than *A. pseudopunctipennis* (92 caught) in El Salvador on the other hand *A. pseudopunctipennis* represented 18.6 per cent of the catch. In both the regions referred to *A. albimanus* became more abundant during the rainy season while *A. pseudopunctipennis* was a dry season species. It was also demonstrated that the most malarious months of the year were usually preceded by an increased prevalence of *A. albimanus*.

W A L David

WEATHERSBEE A A Observations on the relative Attractiveness of Man and Horse for *Anopheles albimanus* Weideman *Amer J Trop Med* 1944 Jan v 24 No 1 25-8

The importance of a given species of mosquito as a vector of malaria is obviously bound up with the relative frequency with which it takes blood from man or other animals. It is now known that certain mosquito species are composed of biological races which prefer different hosts. An investigation of the preference shown by *Anopheles albimanus* carried out in Eastern Porto Rico proves that a horse is chosen in preference to man. The ratio is approximately 20-1. Two traps were prepared in similar positions near a fresh water pond. One was occupied by a man and the other by a horse. The man kept under a mosquito net within the trap. Eight different horses and ten men were used on different occasions and on repeats being made were paired off in different combinations. The men were blacks, mulattos and whites.

of 5-10 cc of infected blood. The Italian strain was used in 154 patients, the West African strain in 139. Parasites appeared in the blood of 95.6 per cent of the former and in all the latter. These results compare favourably with those previously obtained by the authors in Socola [Rumania] where the majority of patients were drawn from the rural population. In Socola 8 per cent of patients were refractory to the Italian strain and 23 per cent to a Rumanian strain of *P. malariae* in spite of the low incidence of quartan malaria in Rumania.

The parasite density was rarely high; it exceeded 50 parasites in 25 microscopic fields in only 2 per cent of cases. The parasite density of the donor's blood does not always influence either the incubation period or the parasite density in the recipient if the amount of infected blood injected does not exceed 10 cc. It is interesting to note that only 34.6 per cent of the patients presented at any time both male and female gametocytes, a fact which explains in part the difficulty met in attempts to infect mosquitoes with *P. malariae*.

Forty-seven patients developed regular quartan fever, 47 others had double quartan fever, and 23 triple quartan (quotidian fever). More frequent was the development of mixed types of fever, and 24 patients had very irregular fever charts. The duration of the febrile attack is longer than in infections with other types of malaria parasite; this probably explains in part the efficacy of treatment with *P. malariae*. The form and intensity of the fever seem to be independent of parasite density.

P. malariae is somewhat more resistant to both quinine and atabrin than are *P. vivax* and *P. falciparum*. [See also CIUCA *et al.* this Bulletin 1929 v. 26: 944, 1931 v. 28: 119.] Norman White

COVELL G. The Prophylaxis and Treatment of Malaria in War. J. Malaria Inst. of India 1943 Dec. v. 5 No. 2: 129-57, 4 charts, [95 refs.]

The scope and objects of this contribution are stated in the last paragraph of the introduction as follows: Many of the problems which were subjects of debate during the last war are now once more being widely discussed, and such well worn topics as the relative merits of oral and intramuscular quinine and of so-called prophylactic or suppressive drug treatment are once more to the fore. Conversations with medical specialists and others have made it evident that many of these officers are unaware of the great volume of patient investigation which has been devoted to this subject and of the conclusions arrived at as a result. It seems worth while therefore to summarize the available information on certain of the points under discussion. The author then proceeds to summarize the results of many of the outstanding investigations of the last 25 years into the use of antimalarial drugs and antimosquito measures. This is prefaced with references to the failure of malaria control measures during the last war.

Suppressive treatment should not be adopted indiscriminately; it may be in certain circumstances the only method of keeping a body of troops on its feet. If quinine be used it should be given daily, the minimum effective dose being between 6 and 10 grains. In peace time conditions mepacrine 0.2 gm twice a week will mask symptoms in most cases, but for troops operating in highly endemic areas 0.1 gm daily or on six days of the week is now used.

To explain the origin of divergent views still expressed as to the best means of treating the malaria attack the author outlines the history of malaria treatment during the past two centuries. Many of the standard treatments now used are described most of them entailing the use of much more moderate quantities of antimalarial drugs than the heroic doses of quinine commonly employed during the last war. A considerable proportion of relapses will occur despite whatever form of treatment is adopted. Intramuscular quinine therapy is not justified as a routine treatment in the case of debilitated patients and of patients suffering from wounds there is a greatly increased risk of untoward results. If intramuscular medication is decided upon mepacrine methane sulphonate (atebrin musonate) is preferable to quinine. Intravenous quinine is of the greatest value in certain emergencies.

With regard to the relative value of quinine and mepacrine in the treatment of malaria there is little to choose. Different strains of malaria parasites differ in their reactions to the two drugs in certain respects. It is probably true that relapses are fewer after a 5 day treatment with mepacrine than after a 5 day treatment with quinine. Quinine is more potent as an antipyretic.

The chief function of pamaquin is not the destruction of gametocytes nor the suppression of the clinical attack but the reduction of the relapse rate especially in benign tertian and quartan infections which are the most prone to relapse.

The special difficulties of carrying out necessary antimosquito measures in war conditions are described. Site selection of camps is the most important of malaria preventive measures in wartime. The spray killing of adult mosquitoes has a wide field of application in war as in peace and if the necessary supervision is unceasingly maintained no other measure produces such dramatic and consistently good results.

The dustless method of applying Paris green first described by BARBER and his colleagues in Greece is of special value in wartime when transport difficulties impose the reduction of the weight of material carried to a minimum.

The importance of methods of personal protection against mosquitoes is stressed. The author considers that shorts are entirely unsuitable for campaigning in the Tropics. The success of methods of personal protection like that of suppressive treatment depends on the degree of antimalaria discipline obtaining among the troops.

[Anything like a complete summary of this paper is out of the question. The author might have rendered a greater service to those for whom the paper is written if he had concentrated more on the results of his own vast experience and less on the divergent views of others and on the historical background.]

Norman White

RAPER A B OGBORN R S & WILSON D Bagster. Studies in Malaria in the East Africa Command. I. Treatment of Subtertian Malaria in Africans. *East African Med J* 1944 Mar v 21 No 3 66-72

The results of a trial of three short courses of treatment for East African native soldiers suffering from subtertian malaria are reported. Each course was of only three days duration. The limitation was designed to reduce the length of hospital treatment and to economize quinine. The first course was 1st day quinine 10 grains twice and mepacrine 0.1 gm twice. 2nd and 3rd days 0.1 gm mepacrine twice.

daily. The second course consisted of mepacrine 0.1 gm twice a day for three days. The third course was 10 grams of quinine twice daily for three days.

All cases were of uncomplicated active malaria; they were of all grades of severity. The only election made was in cerebral malaria; there were three such cases while the trials were in progress and these were treated with parenteral quinine. The authors do not consider that such phenomena as meninismus irritability and the minor degrees of toxic psychosis indicate cerebral malaria.

The patients were divided into two groups: immune and non-immune. An immune subject is one who grew up in a locality in which the malaria transmission season exceeds six months in the year. The total number of cases treated was 281. Effectiveness of treatment was estimated in terms of duration of fever and of parasitaemia. The results are tabulated below—

Course of Treatment	Immune Cases		Non Immune Cases	
	Total Cases	Average Duration of Fever from Start of Treatment	Total Cases	Average Duration of Fever from Start of Treatment
		days		days
1 Quinine and mepacrine	20	0.96	104	1.01
2 Mepacrine	16	1.00	38	2.00
3 Quinine	20	1.28	81	1.58

In some cases fever was prolonged beyond the end of the three-day course: three times among 28 immunes and 16 times among 223 non-immunes. The longest period of fever was 7.5 days among non-immunes and five days among immunes.

A thick blood film from each patient was examined daily. The average duration of parasitaemia (asexual forms) in the immune and non-immune groups respectively was: quinine and mepacrine 3.4 and 3.1 days; mepacrine 2.2 and 4.1 days; quinine 3.0 and 3.1 days. From a quarter to a third of the non-immune cases harboured gametocytes after treatment. The number of gametocyte carriers among the immunes was much lower.

Conditions made it impossible to estimate the relapse rate. On only one occasion was it necessary to repeat the course because of an early recrudescence.

Twenty-six immune and 26 non-immune patients were given no specific treatment. The average duration of fever in the immunes was 4 days and in the non-immunes 9.3 days. The average duration of parasitaemia (asexual form) in the immunes was 7.3 days and in the non-immunes more than 13 days.

The conclusions reached are that it is not necessary to admit immune Africans to hospital for malaria pyrexia but a short course of treatment will reduce their period of disability by a day or two. For non-immunes treatment is essential and hospitalization desirable. All three courses met most of the essential requirements; the mepacrine and quinine course was the most satisfactory.

Norman White

WIELSCH H & NACHMANSOHN D *On the Toxicity of Atabrine* *Proc Soc Exper Biol & Med* 1943 Dec v 54 No 3 336-8

Choline esterase is an enzyme which destroys acetyl choline the substance responsible for the actions produced by stimulation of the parasympathetic (vagus) nervous system. Mepacrine (atabrine) inhibits choline esterase to an extent of 59 per cent in a concentration of 10^{-5} molar i.e. 4 microgrammes of free base per cc. [This concentration is reached in the leucocytes but not in the plasma during the clinical use of mepacrine]. Quinine and morphine are 200 times less effective while eserine (physostigmine) is 100-200 times more potent. The authors suggest that the toxic effects produced by mepacrine e.g. gastro-intestinal irritation may be due to this inhibition of choline esterase (which would be similar to stimulation of the vagus nerve) and that the toxicity of other antimalarials may similarly be due to their effect upon enzymes. [However bradycardia is not prominent as a toxic symptom induced by mepacrine although it would occur if the vagus was stimulated].

F Hawking

1 HEGSTED D M McHIBBIN J M & STARE F J *Nutrition and Tolerance to Atabrine* *J Nutrition* 1944 Feb 10 v 27 No 2 141-8 [22 refs]

11 ——— & ——— *The Effect of Atabrine on Choline Deficiency in the Young Rat* *Ibid* 149-53 1 fig

1 The experiments described were made in order to determine whether certain diets influence the toxicity of atabrine when the latter is administered over long periods. Young albino rats and day old chicks were used as test animals. Details are given of the ration to which certain vitamins were also added. The effect of deficiency in protein and vitamins was investigated. The atabrine was distributed throughout the food in doses up to 65 mgm per 100 gm by spraying over it an alcoholic solution of the dihydrochloride which was then allowed to dry. In some cases the experiments lasted 1 year and histological examinations were made of the tissues of rats which had received atabrine for six months. The authors point out that the results may not apply to man as some species tolerate the drug less well than others. Their results indicate that the maximum level of atabrine in the tissues is reached in 3-4 weeks on a diet containing 40 mgm per cent.

The following are the authors' conclusions —

1 Atabrine added to an adequate diet in levels such that the rat receives 25 mg per kilogram per body weight per day or less is completely non toxic as judged by growth, general appearance and behavior, gross and micropathology and reproductive ability.

2 Atabrine levels of 40 to 65 mg per 100 gm of ration retarded growth by 20 to 30% the fur is discolored and the animals are unkempt. The addition of various vitamins, yeast or protein to an already adequate diet does not prevent these changes.

3 The slow growth obtained on suboptimal levels of riboflavin or protein is further decreased by the addition of 40 mg % atabrine to the diet. With diets suboptimal in vitamin A addition of atabrine does not cause a further reduction in growth rate.

4 On the basis of rate of growth on diets containing atabrine the chick is from three to four times as tolerant of atabrine as is the rat.

11 When a low protein low-choline diet was given to groups of weanling rats with or without atebrian in doses of 40 m.m. per 100 gm ration a high percentage of deaths occurred in the control group but none in the group receiving the drug. The part played by atebrian has now been examined more fully. The diets used to which certain vitamins were added are described in detail and the drug was incorporated as described above. In the present investigation three of six control rats on a low protein diet died before the 14th day of the experiment while those receiving in addition 40 m.m. per cent of atebrian all survived for the period and showed only slight kidney damage. In another group of rats receiving low-choline diet somewhat similar results were obtained. A large percentage of the controls and those receiving a similar dose of atebrian to the above had haemorrhagic kidneys whereas 60 m.m. per cent of atebrian in the ration gave almost complete protection. The drug appeared to have no lipotropic action. The possible mechanism of its action is discussed. The efficiency of utilization of food was impaired by atebrian in low dietary intakes as shown by growth curves. J. D. Fulton

RECTOR, V. H. Anti Malaria Ditching by Dynamite. *J. National Malaria Soc. Tallahassee Fla. 1943* v. 2 No 2 11-15 7 figs on 4 pls. Discussion 15-20 by DORRER, R. E. & TAYLOR, J. E.

The blasting of open earth ditches in wet or marshy land has been successfully employed in the United States for a long time. This paper and the discussion it evoked describe clearly how the operation should be carried out in a variety of conditions. They should be of great value to anyone contemplating work of this nature. [A description of the successful application of this method of antimalarial drainage in Palestine was summarized in this *Bulletin* 1938 v. 30 96.]

Ditching with dynamite is generally the least expensive method for ditching in soft soils or through heavily wooded swamps. About the smallest ditch that can be economically blasted is one two feet deep and three feet wide and the largest ten feet deep and thirty feet wide. After a right-of-way has been cleared from 10 to 15 feet wider than the proposed ditch by the removal of standing timber and logs (it is not necessary to remove stumps) a crew of 3 to 10 men can blast 750 to 3000 feet of channel in one day. But drainage by dynamite is specialized work and an experienced blaster must supervise the operation. The fuse method should not be used for the detonation of dynamite. An electric blasting machine should be employed. The small pocket-size detonator is recommended. The lead wire from the primed cartridge must be at least 500 feet long. Under ordinary conditions one pound of dynamite is required to move one cubic yard of soft mucky material.

For detailed information concerning the making of bore holes and loading them with dynamite the papers should be consulted.

Norman H. Hilde

LEWIS, W. A. Malaria Control Experiences with Circular Joint Ditch Paving Slabs and Automatic Siphons. *J. National Malaria Soc. Tallahassee Fla. 1943* v. 2 No 2 61-4 2 pls.

OLIVIER, L. J. G. Malaria Control in Practice. *Pub. Health* Johannesburg 1944 Apr. 8 No 3 pp 57-9 11 13

SEELER A O OTT W H & GUNDEL Mary E Effect of Biotin Deficiency on the Course of *Plasmodium lophurae* Infection in Chicks *Proc Soc Exper Biol & Med* 1944 Feb v 55 No 2 107-9 1 fig

In a recent publication TRAGER reported experiments indicating that certain malarial infections of birds were intensified by withholding biotin from the diet [this *Bulletin* 1943 v 40 676] The authors of the present note are able to confirm these observations as a result of experiments on chicks infected with *Plasmodium lophurae* Chicks on a biotin free diet and showing signs of biotin deficiency developed infections which at the peak were twice as heavy as in control chicks kept on an adequate diet C M Wesson

TAYLOR F H The Intermediary Hosts of Malaria in the Netherlands Indies

This book is reviewed on p 698

BLACKWATER FEVER

FOY H GLUCKMAN J & KONDI Athena Pigment Metabolism and Renal Failure in Acute Sulphonamide Haemolysis resembling Blackwater Fever *Trans Roy Soc Trop Med & Hyg* 1944 Mar v 37 No 5 303-19 3 graphs & 2 figs on 1 pl [44 refs]

Detailed clinical and laboratory findings are given of a case of an acute massive intravascular haemolysis which followed the administration of benzyl sulphandamide There were oxyhaemoglobinaemia methaemalbuminaemia haemobilirubinaemia and intracorpuseular methaemoglobinaemia with a profound fall in the red cell count terminally the patient became anuric and azotaemic and died The almost complete anuria was not associated with blockage of the renal tubules with precipitated products of haemoglobin there were however changes in both the tubules and the glomeruli such as are characteristic in blackwater fever and incompatible transfusions

Recent spectroscopic work has established that in toxic haemolysis due to sulphonamide drugs intracorpuseular methaemoglobin plasma oxyhaemoglobin methaemalbumin and haemobilirubin are all present and that the urine may contain either or both oxyhaemoglobin and methaemoglobin A much rarer pigment is sulphaemoglobin

Plasma oxyhaemoglobin methaemalbumin and haemobilirubin are common to all intravascular haemolyses but a point of considerable interest is the presence of intracorpuseular methaemoglobin in sulphonamide toxic haemolysis and its absence so far as is known in blackwater fever in other intravascular haemolysis nothing is known concerning its presence or absence Methaemoglobin is an oxidation product of haemoglobin the iron moiety being converted from the divalent to the trivalent state A number of substances not oxidizing agents such as aniline acetanilide plasmoquine [this *Bulletin* 1939 v 36 122] nitrobenzene and sulphonamides also produce methaemoglobinaemia In the case of aniline and acetanilide the production of *p*-aminophenol and its derivatives such as quinoneimine have been

shown to be responsible for the production of methaemoglobin. It has been suggested that *p*-aminophenol and emiquinones may play a part in the oxidation of haemoglobin to methaemoglobin by sulphonamides and it has been stated that following the administration of sulphonamides the urine may contain *p*-aminophenol but it may be remarked that the tests used for the detection of the latter substance are not specific. Methaemoglobinæmia is less serious than sulphamoglobinæmia since the former reverts to oxyhaemoglobin in a few days and this change can be accelerated by reduction with such agents as methylene blue or ascorbic acid.

The methaemoglobin of the urine is not derived from the plasma methaemalbumin or intracorpuseular methaemoglobin nor is its formation entirely dependent upon the urinary pH or ionic concentration. It may be noted that urochrome and certain other urinary pigments will convert haemoglobin into methaemoglobin *in vitro* in the absence of oxygen.

The renal failure that occurs in blackwater fever incompatible transfusions, crush injuries, utero-placental damage and severe vomiting as well as in sulphonamide poisoning and excluding in the latter those due to mechanical blockage by crystalline derivatives of the drug cannot as in the present case be explained simply as the result of blockage of the renal tubules by products of haemoglobin precipitated from an acid urine. Recent work indicates that many factors may be involved including diminished glomerular filtration following dehydration, actual or physiological disturbances in acid-base-electrolyte-water balance and upsets in the permeability of the glomerular membrane. Reduction in blood flow might specially affect the tubules because of their high oxygen requirements and lead to degenerative changes with disturbance of tubular reabsorption and concentration [this *Bulletin* 1943 40 363].

In the present case the outstanding feature in the kidney was the wide separation of the tubules by intensely oedematous tissue in which the reticular fibres were unusually obvious. Lying in the oedematous mass were pools of coagulated lymph and focal aggregation of plasma cells especially marked in the region of the large calices. The oedema nowhere tended to compress the tubule. In the proximal convoluted tubules the epithelium was degenerated and the nuclei irregular and of bizarre shapes. In many areas desquamated cells from the convoluted tubules were seen to be lying free in dilated tubules surrounded by eosinophilic debris. In such tubules the basement membrane was thick and opaque. The majority of the glomerular tufts with their epithelium and capsular spaces appeared normal. There was a great difference in the histological appearances of the kidney tubules and glomeruli in the paraffin and frozen material. In the paraffin sections the sub-capsular spaces and glomerular tufts appeared normal and the tubules much dilated with debris suspended freely in the lumen. In the frozen material on the other hand the capsular spaces were almost non-existent and the glomerular tufts filled almost the whole of the space. The tubules were less dilated and the debris in them although loosely disposed occupied a much greater proportion of the lumen than in the paraffin section. It is suggested that the distortion brought about by the dehydration consequent upon the paraffin method makes this technique unsatisfactory for correctly assessing the changes that take place in these delicate structures in the anuric condition.

A great increase in the osmotic resistance of the red cells to saline and to lyso lecithin was found but it was not associated with any changes in the cell volumes thicknesses diameters or ratios and the Price Jones curve was within normal range. It was thought that changes in the cells environment perhaps in the nature of circulating haemolysins might be more important than physical changes in the structure of the red cells rendering them more susceptible to destruction.

I Murgatroyd

TRYPANOSOMIASIS

WEINMAN D Cultivation of *Trypanosoma gambiense* in vitro in Cell Free Medium *Proc Soc Exper Biol & Med* 1944 Jan v 55 No 1 82-3

Referring to the work of BRUTSAERT and HENRARD [this *Bulletin* 1937 v 34 530 1938 v 35 704] the author records his method of cultivating *Trypanosoma gambiense*. The culture medium was a modification of the *Leptospira* medium used by NOGUCHI and BATTISTINI (*J Exper Med* 1926 v 34 851) [this *Bulletin* 1926 v 23 738] for the cultivation of *Bartonella bacilliformis* it had the following composition —

Solution A — Sodium chloride 8 gm nutrient agar (1.5 per cent Difco) 4 gm distilled water to 900 cc

Solution B — Citrated human plasma 100 cc human haemoglobin (Blood 1 part distilled water 3 parts) 20 cc

A is autoclaved and B added later. The medium is dispensed in test tubes provided with rubber stoppers. The final pH is 7.4-7.5.

Cultures are incubated at 26-28°C and become positive 7-10 days after inoculation even when the original inoculum contains no microscopically demonstrable trypanosomes but the tubes should not be discarded until after one month. The trypanosomes have lived in this medium for periods up to 71 days and cultures have been maintained by numerous transfers for 127 days. [Brutsaert and Henrard found the cultivation of trypanosomes an effective method for the diagnosis of scanty infections it seems that it might be useful in an investigation of the incidence of inapparent infections of man with *T. gambiense* and *T. rhodesiense*. See also this *Bulletin* 1930 v 27 244 1935 v 32 34.]

J F Corson

ACRES I S The Treatment of Sleeping Sickness *Med Press & Circular* 1944 May 3 278-81

A general account

1 NASH T A M The Control of Sleeping Sickness in the Raphia Pole Trade *Bull Entom Res* 1944 Apr v 35 Pt 1 49

11 — A Low Density of Tsetse Flies associated with a High Incidence of Sleeping Sickness *Ibid* 51

To understand the transmission of sleeping sickness or to control it one must know the ecology of the villager as well as of the fly. Nothing could illustrate the principle better than these notes.

1 In most parts of Northern Nigeria *Glossina tachinoides* is localized to stream banks and may be controlled by clearing bush. Some

streams are choked by the palm *Raplia* which makes condition very suitable to this fly. The villager needs the palm for its straight light ribs are excellent for roofing and cutting the poles is an important village industry. Pole cutters are therefore in close and repeated contact with *C. fuscoides*. In order to reduce risk of transmission of trypanosomiasis a law has been made to limit pole cutting to the first 14 days of each three monthly period. This (if observed) will stop transmission and protect the men for it allows a whole generation of flies to die out between the period when the men are in contact with them.

In the same part of the world streams become dry except for rare water holes. Tsetse flies tend to be concentrated at the water holes and just here there is a close contact of man and fly. This becomes still closer if water is really scarce for the villager must drink the stream bed and the woman has to sit and scoop up small quantities of water into her calabash. She may moreover be other women waiting and gossiping and being bitten.

In a particular place Naik failed to find any *G. palpalis* in some miles of stream bed except at such a water hole where he caught four. At this village a very high rate of sleeping sickness (70 per cent of 43 people) had been demonstrated.

In the author's experience this is not an isolated case. At the end of the dry season fly and man are driven into close contact at water holes and it is probable that a few flies may become infected and transmit the trypanosome to a number of people. P. A. Burton

QUETGLAS A. & MARTOPELLI J. La enfermedad de Chagas en el sur de Córdoba. [Chagas Disease in South Córdoba.] *El Dia Médico* Buenos Aires 1943 Aug. 16 y 15 No. 33 914-15 7 figs.

The authors have written this paper with two objects in view: first to record the existence of Chagas disease in a part of the country where its presence has been denied and second to acquaint their colleagues with the main features of the disease its cause, symptoms, aetiology, diagnosis and treatment. These are all plainly and simply stated but among the methods of diagnosis, biopsy examination of the myocardium is proposed. In their colleagues would be wiser to avoid. Details of three cases are given in the form of a table, the patient being a boy of 10, a girl of 16 and a man of 21 years. Photographs showing oedema of the lids and a series of electrocardiograms are reproduced. H. Harold Scott

LEISHMANIASIS

SOMERS R. B. U. Kala Azar treated with 4,4-Diamidino-stilbene. *Lancet* 1944 Apr. 22 531-3.

The author states that in the last eight years he has treated 26 cases of kala azar in the Sudan. The first 21 were treated with antimony tartrate or neostibosan and the patients either died in hospital or ran away before completing the course. The last five cases, the subject of this paper, were treated with diamidino-stilbene and they all responded favourably. They had had some previous treatment before admission to hospital under the care of the author who was only

responsible for the final two courses in cases 1 to 4 and the final course in case 5. The drug was administered intravenously at intervals of one to three days the initial dose being 1.1 mgm per kgm of body weight. The dose was increased gradually to 3.5-4.0 mgm per kgm.

The first patient had received four courses of sodium antimony tartrate in which a total of 175 grains was administered without provoking any response. He was then admitted to hospital and given during 53 days a course of diamidino stilbene (2.87 gm) followed four months later by a second course (1.32 gm). The second case was complicated by severe scorbutic and septic lesions in the mouth. These responded to ascorbic acid and sulphapyridine. Two courses of diamidino stilbene (2.23 and 0.78 gm) were given with an interval of about one month. The third patient previously treated with the antimonial anthiomaline was given two courses of diamidino stilbene (2.48 and 1.6 gm) with an interval of about three months. The fourth case previously treated with sodium antimony tartrate was given two courses of stilbene (2.75 and 2.18 gm) with a three weeks interval. The fifth patient who had already had three courses of 15 daily injections of 50 mgm of diamidino stilbene with intervals of nine days between the courses relapsed 1 month after the last course. He was then treated with antimony tartrate (27.5 grains). In spite of this treatment he was dangerously ill when admitted to hospital. He had a large buccal ulcer and a swollen parotid gland. These were cured with sulphapyridine and vitamin C. He was then given a course of 31 injections of diamidino stilbene (4.35 gm). It is concluded that if six months good health and continued improvement can be taken as a sign of cure it is safe to regard the first four patients as cured. The fifth is still under observation as after four months the blood is still abnormal. As regards reactions to the drug all five showed these in one form or another—breathlessness headache dizziness feeling of emptiness in the chest vomiting epistaxis. C M Wenyon

GIL BERMUDEZ A. La moderna terapeutica del kala azar infantil [The Modern Therapy of Infantile Kala Azar] *Med Española* 1943 Sept v 10 No 56 301-14 3 figs [Bibliography]

In this paper is described the successful treatment in Spain of 15 cases of kala azar in children varying in age from 6 months to 9 years with solustibosan in concentrated aqueous solution or oily suspension as already noted by KIKUTH and SCHMIDT [this *Bulletin* 1944 v 41 194]. The water solution is five times the usual strength 1 cc representing 0.1 gm of pentavalent antimony while the suspension in oil is such that 1 cc represents 0.054 gm of pentavalent antimony. The concentrated watery solution was administered intramuscularly in daily doses for 10 days the full course being 1 cc per kgm of body weight. In some cases such a course did not effect a cure and it was followed up by a course of six intramuscular injections of the oily suspension administered on alternate days the total quantity given representing 2 cc for each kgm of body weight. In some of the cases a single course of the oily suspension was found to be sufficient to effect a cure while in others two such courses were required. Both the preparations were of low toxicity and were well tolerated there being neither local nor general reactions. In certain cases the condition of the patient demanded blood transfusion while to all injections of vitamin C and

liver extract were given. The author concludes that the two preparations particularly the oily suspension represent a marked advance in the therapeutics of infantile kala azar. *C M Henyon*

MCCORD C P American Leishmaniasis (Jungle Ulcer) A Tropical Occupational Disease *Indust Med Chicago* 1939 July 18 No 7 769-84 9 figs (1 map) [Bibliographies]

The industry of gum collection in the Yucatan Peninsula affords employment for some 13 000 chicleros foremen and others who produce an annual output of some 10 000 000 pounds of chicle [gum of the apodilla tree]. It is only during the six months rainy season June to November inclusive that the latex flows in the trees and it is then that the chicleros with their families form camp near the jungles in which the trees grow. Only the chicleros enter the jungle to tap the trees and it is they who are most liable to cutaneous leishmaniasis. The present article is a general account of the industry and the mode of life of the chicleros and a dissertation on the subject of the various forms of leishmaniasis particularly those which have been described from South and Central America. As regards the type occurring amongst the chicleros the information given is very similar to that in a paper by BELTRAN and BUSTAMANTE [this *Bulletin* 1943 1 40-41]. The object of the article is to show that the cutaneous leishmaniasis of the chicleros or jungle ulcer as it is termed is actually an occupational disease about the actual method of transmission of which there is no precise information. *C M Henyon*

FEVERS OF THE TYPHUS GROUP

ZIRONI A Ueber die Bedeutung der Proteus Δ Infektionen bei Rickettsiosen 'The Significance of *Proteus* Δ Infections in Rickettsial Diseases' *Ztschr f Immunitätsf u Exper Therap* 1943 Dec 11 1 104 No 2/3 107-18

After a detailed review of the literature of the subject the author discusses the significance of the frequent occurrence of *Proteus* Δ 19 in the blood of typhus patients during the early stages of the fever. His view is that the organism is a mutation form of *Proteus mirabilis*. He believes that the change in the type of the organism is brought about by the action of the anti Δ common to *Pickettsia proculek* and *P* Δ 19 and that it is analogous with the mutation that occurs in strains of pneumococci when they acquire the characteristics of other strains which have been brought into contact with them in the form of killed cultures either in the test tube or in the human body.

The anti Δ common to *R. proculek* and *Pr* Δ 19 is produced by the former organism when it invades the human body so that it inhibits the action of the antibodies which normally prevent the *Proteus* organisms from invading the blood stream. In this way the typhus infection causes a condition of increased susceptibility to *Pr mirabilis* as well as the change in type mentioned above.

Many examples are quoted of infections which cause an increase in the susceptibility of the body to other organisms for example the virus of influenza arouses the bacillus of Pfeiffer to activity and other viruses have corresponding actions on special bacteria.

The author has already suggested in 1941 that the antigen which *Proteus* A has in common with *R. prowazekii* may serve as a source of vaccine against typhus fever. He goes still further and suggests that if it should be possible to transform the *Proteus* A antigen into a hapten this could be given intravenously as a valuable therapeutic agent and he claims that already he has had good results from this haptentherapy in typhoid fever, brucellosis and staphylococcus infection. No experimental work is described in this paper.

John W. D. Megaw

BARTH C. Weiterer Beitrag zur Frage des *Bac. proteus* A19 bei experimentellem Fleckfieber. 2. Mitteilung. [A Further Note on *Proteus* A19 in Experimental Typhus Fever.] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1943 Dec 11 v. 104 No 2/3 227-37 [13 refs.]

The author had already shown that a special strain of *Proteus* (*Pr* A19 B) immunized guinea-pigs against typhus fever.

He later gave subcutaneous injections of killed vaccines made from this strain to two persons and after an interval of two months inoculated these persons with 5 cc. of blood from a patient at the height of an attack of typhus fever. In each case there was a short febrile attack lasting two days after an incubation period of nine days. After vaccination and also after the febrile attack the Weil-Felix titre did not rise above 1-50.

Six other persons were vaccinated with larger doses and again the titre with O and H strains of A19 was low but it rose to 1-200 with the homologous strain A19 B. These persons were later inoculated with blood from typhus patients and only one of them had an attack; this was typical, lasting 16 days after an incubation period of 14 days; the O A19 titre did not exceed 1-100.

Various neutralization tests were carried out with the sera of these persons after vaccination. Three men were inoculated with a mixture of infective material and varying doses of the sera. The person who was given the largest dose of serum had no reaction; the other two had high fever lasting two days and beginning on the third day after inoculation.

From these and other neutralization tests in animals it is claimed that genuine immunity is caused by the vaccine in 75 per cent. of the subjects.

The author suggests that this method of vaccination should be tried in places where typhus fever occurs either in endemic or epidemic form.

Details of the various experiments are not given and the results are stated in general terms. [For a reference to FELIX's work on vaccination of animals with *Proteus* O A19 see this *Bulletin* 1943 v. 40 230.]

John W. D. Megaw

EYER H. & DILLENBERG H. Die Serodiagnostik des Fleckfiebers. Eine Vergleichende Untersuchung. [The Serum Diagnosis of Typhus Fever.] *Ztschr. f. Hyg. u. Infektionskr.* 1943 Nov 20 v. 125 No 3/4 308-30 3 figs. [14 refs.]

The findings in more than 4 000 comparative tests with the Weil-Felix and Rickettsia agglutination reactions are analysed and discussed in this paper. These tests will be referred to as the W.F. and R.A. tests in the following summary.

The results obtained in healthy unvaccinated and healthy recently vaccinated persons with no history of attacks of typhus fever are given in the table below. The figures are percentages in each case.

	Healthy unvaccinated		Healthy vaccinated (with Weil vaccine 1 to 6 months previously)	
	Germans	Poles	Germans	Poles
W-F Titres				
0	43	77	35	16
1-70 (non-specific)	56	69	47	5
1-30 (suspicious)	1	3	10	22
Over 1-30 (positive)	0	1	8	10
R-A Titre				
0	69	43	3	1
1-70 to 1-80 (non-specific)	30	54	4	50
1-160 (suspicious)	1		4	28
Over 1-160 (positive)	0	1	31	10

The reactions of 21 healthy Poles were tested before and after vaccination with Weil vaccine. The rise in the R-A titre was more uniform and persistent than that of the W-F titre though on the whole the responses to the two tests were rather uniform. Titres of 1-160 or over were found in 14 with the W-F test and in 17 with the R-A test.

Persons who had been hyperimmunized by repeated large doses of vaccine and then had continually been bitten by infected lice in the preparation of Weil vaccine reacted in surprisingly low titres to both tests. The titres were lowest in those who had been employed for long periods in this occupation. Those who suffered from attacks of typhus fever while employed showed only moderate rises in the titres with both tests in most cases.

The latest titres observed in 19 persons in whom hyperimmunity had been established beyond doubt in the above ways were —

	Negative	1-10 to 1-40	1-80 to 1-160	1-320
R-A	3	15	1	—
W-F	1	8	8	2

In a large series of cases of typhus fever in persons who had not been vaccinated the percentages of significant reactions (P-A 1-160 and W-F 1-30) on different days of the disease were as follows —

Day of Fe	3	4	5	6	7	8	9	10	11	12	13	14
W-F	4	14	26	5	66	91	96	90	83	90	76	91
R-A	7	49	69	86	96	94	98	100	9	100	100	100

[Low titre reactions with P-OV19 whose significance has been stressed by FELIX when they follow negative or lower titre reactions have not been taken into account by the authors.]

In typhus patients who had been vaccinated the reactions were irregular later in appearing and of lower titres with the W F test doubtful reactions (titre less than 1-320) tended to preponderate whereas the R A titres always became significant and so were more reliable in diagnosis

Non specific positives such as occur with the Weil Felix test in such conditions as bowel diseases and jaundice were never observed with the R A test and the authors claim that a positive R A reaction never occurs in persons who have not at some time been in contact with *R. prowazeki*

They also claim that a persistently negative R A reaction has never been observed in any case of proven typhus fever

John W D Megaw

RUBINSTEIN B N SACHAROVA P I & YAKOVLEVA E S [The Use of the Agglutination Phenomenon in the Early Diagnosis of Typhus I Communication The Stimulation of the Formation of Agglutinin in Typhus] *Klinicheskaya Meditsina* Moscow 1943 v 21 No 6 65-7 [In Russian]

As the Weil Felix reaction is very seldom positive before the 5th or 6th day of the disease the authors have experimented with an intramuscular injection of lactine (or 2 cc of milk) to raise the titre of the agglutination. A total of 60 cases were observed 45 with typhus and 15 with other diseases such as influenza malaria and pneumonia. Out of 45 typhus cases the titre of the Weil Felix reaction after an injection of milk was raised in 27 cases and remained unchanged in 18 in all the 15 control cases the titre of the reaction was unchanged which shows the rôle of a specific factor in the dynamics of the Weil Felix reaction. To give an example. On the 5th day of the illness a patient who showed all clinical features of typhus but whose Weil Felix reaction was negative received 2 cc of milk. A sample of blood which was withdrawn six hours after the injection proved positive (titre 1/200) and the sample of blood withdrawn 12 hours after the injection also positive (titre 1/800). In some cases which showed a negative reaction on the 6th 7th or even after the 9th day of the illness an injection of milk turned the negative reaction into a positive one within 6 or 12 hours. The question of the mechanism of this rise in the titre remains very obscure

H H Suann

WERTMAN K & PLOTZ H Presence of Typhus Antibodies in Commercial Frozen and Dried Complement *Proc Soc Exper Biol & Med* 1944 Jan v 55 No 1 29-31

In a series of complement fixation tests for epidemic typhus in which commercial complement was being used the authors found some positive reactions in sera known to be negative

By a series of tests it was found that some commercial complements contained specific epidemic typhus antibodies

One of the manufacturers concerned admitted that the complement might have been prepared from guineapigs that had been used in tests for epidemic typhus vaccine

Complement of unknown origin should be tested for the presence of specific antibodies
John H. D. Macfarlane

KEDICKE R. Die Bedeutung von Empfänglichkeit natürlicher Resistenz und erworbener Immunität in der Epidemiologie des Fleckfiebers [The Significance of Susceptibility Natural Resistance and Acquired Immunity in the Epidemiology of Typhus Fever] *Ztschr f Immunopath u Exper Therap* 1943 Dec 11 v 104 No 2 s 283-97 3 figs. [12 refs.]

The author discusses some of the factors concerned in causing variations in the epidemiological features of typhus fever.

He believes that the apparent infrequency of the disease in young children is not due to immunity against infection but to resistance by which the attack is modified. He holds that a close investigation for the detection of mild cases will show that children are attacked just as frequently as persons of the older age groups. One example is quoted of an epidemic in which 29 per cent of the attacks were in children under 10 years of age. These attacks differ in type from those occurring in older persons who are partly immune.

Further investigation is needed to determine whether the blood of children and others suffering from mild attacks is infective to lice.

The seasonal incidence of the disease usually conforms to the well recognized pattern but in highly susceptible communities there may be epidemics in summer. One example was the epidemic in East Europe in 1941-43 in which the number of attacks increased progressively from the early months of 1941 reaching the peak in January 1942 and then following the usual course. Even when the seasonal curve of a widespread epidemic is normal there are often localities in which the incidence is greatest in summer.
John H. D. Macfarlane

BREVIDO B. S. [Localization of the Initial Rashes in Typhus] *Sovetskaya Meditsina* Moscow 1943 No 11 p 15-16 [In Russian]

Early diagnosis of typhus is still very difficult. The Weil-Felix reaction is positive only in 70 per cent of cases by the fifth day of illness. The use of autohaemotherapy, milk injection, etc. for the purpose of inducing a positive Weil-Felix reaction has not proved very successful. The cardinal feature of the disease is the appearance of an initial rash associated with other symptoms and signs such as high temperature, flushed face, nervous symptoms, etc. The use of mechanical factors (tourniquet, hot bath, cupping) to accentuate the rash has not proved satisfactory. The author strongly recommends that a thorough examination should always be made of the whole surface of the body in suspected cases and not only of the typical sites of the initial rash. Occasionally a few small haemorrhagic areas appear in the region of the sacrum and the buttocks or on the back around the scapulae. These eruptions are sometimes observed 24 hours before the typical places are affected and their appearance is due to an early trauma of the tissues through constant lying on the back. Other diseases (scurvy, haemorrhagic diathesis) may produce similar skin lesions. In cases where these eruptions do occur round the sacrum or the scapulae typhus can often be diagnosed on the third or fourth day about 24 hours before the Weil-Felix reaction is likely to be positive.

H. H. Swann

BREYDO B C [The Symptomatology of Atypical Forms of Typhus]
Klinicheskaya Meditsina Moscow 1943 v 21 No 6 58-65 [In
Russian]

Atypical clinical forms of typhus have often been reported and the variability of the disease is shown by a corresponding varying mortality (5-50 per cent) in different epidemics

The four cardinal distinctive features of the disease are (1) the rash (2) the typical temperature curve (3) nervous symptoms (4) the Weil Felix reaction. Absence of a rash is not rare (4.5 per cent) the temperature curve varies considerably but afebrile cases are uncommon and are clinically severe. Disturbances of the central nervous system are very constant but occasionally they are absent. In atypical cases a correct diagnosis depends on the Weil Felix reaction which is positive in at least 95 per cent. The actual titre is less important than an increasing titre during the course of the illness. The reaction may be delayed in atypical cases even until convalescence and in a few cases it has been negative. The condition of the tongue the pulse the blood pressure leucocytosis and enlargement of the spleen are important aids to an early diagnosis

H W Suann

HOFF F Agranulocytose bei Flecktyphus [Agranulocytosis in Typhus
Fever] *Wien klin Woch* 1943 Dec 17 v 56 No 49/50 709-10
1 fig

A girl aged 16 admitted to hospital about the 12th day of an attack of typhus fever was found to be suffering from agranulocytosis

The total leucocyte count fell as low as 700 per cmm and the granulocytes were 4 per cent

The Weil Felix reaction was tested on two occasions and titres of 1-160 and 1-1200 were observed

After a prolonged and very severe illness complicated also by pneumonia the patient made a good recovery

Eubasinum (sulphapyridine) was given for the pneumonia and apparently did not interfere with the steady improvement in the agranulocytosis

Two blood transfusions were given according to the chart it appears that the granulocytes had already trebled in number before the first of these. The author does not know of any previous report of agranulocytosis as a complication of typhus fever

John W D McEaw

SECRET E Traitement abortif du typhus exanthématique par l'immunothérapie précoce [Abortive Treatment of Exanthematic Typhus by Early Immunizing Therapy] *Maroc Méd* 1944 Jan v 23 No 241 8-13

In 1942 the author administered the total blood of typhus convalescents to persons exposed to special risk of infection. The success of this procedure suggested to him that convalescent blood might be effective in treatment if given at the onset of the attack

In 10 patients he aborted the attack by injecting 10 cc of convalescent blood on each of two consecutive days immediately after the onset. In the 11th case the disease was aborted for three days but the fever returned and the patient had a typical attack lasting 14 days

Then the treatment was changed to the following 15 cc. convalescent blood intravenously and 40 cc intramuscularly combined with 20 cc convalescent serum subcutaneously on each of two consecutive days on the following day the intravenous dose was omitted and on the succeeding six days convalescent serum alone was given intravenously in doses gradually diminishing from 30 cc to 5 cc

The diagnosis was confirmed by the occurrence of a Weil Felix reaction in rising titre This was not due to the injections because the reaction remained negative in control healthy persons who were given varying doses of convalescent blood or serum

Other possible fallacies are discussed and the author claims that the disease can be aborted with certainty by the above line of treatment if it is started within one or two days of the onset He is also satisfied that there is no danger of transmitting the disease to persons who have been wrongly diagnosed [but the case of failure mentioned above raises the question and it would hardly be safe to assume that the blood of persons in the 5th or 9th day of convalescence is always free from infectivity]

John W D Mcaw

KILLIAN H & OBERTREIS E Chirurgie und Flecktyphus [Surgery in Typhus Fever] *Deut Ztschr f Chirurgie* 1943 Nov 10 v 208 No 6/8 445-67

On the Eastern Front during the winter of 1941-42 about 6 to 8 per cent of the typhus patients had surgical complications though most of these were mild At the height of the epidemic the fatality rate was 18 to 20 per cent in cases without surgical complications among the patients treated in the surgical units it was 11 or 12 per cent

Surgical complications are of two main types non specific septic conditions and lesions caused by the Rickettsiae chiefly in the small arteries

Some of the septic conditions were as follows Carbuncle and erysipelas occurred chiefly in the third and fourth weeks Abscesses occurred in many parts of the body half of these were attributed to septic metastases they were often multiple and were specially common in association with necrosis of the skin Parotitis occurred in only 1 per cent of all the cases of typhus of 17 cases with suppuration 13 needed operation and three of these were fatal in spite of sulphonamide treatment

Septic pneumonia also abscesses and gangrene of the lungs were usually fatal they were secondary to septic conditions of the larynx and trachea which are more common than is generally recognized Special efforts should be made to control them by mild antiseptic sprays or inhalations

Only a few cases of otitis media and mastoiditis were seen these were often secondary to pre-existing infections which were lighted up by the disease

Severe empyema was almost as common as parotitis drainage with resection of a rib was the usual treatment there were two deaths among 15 cases

The complications associated with vascular lesions are described as being of the nature of necrotic thrombo-vasculitis they are caused by the formation of nodules in and round the vessels especially those of the skin and central nervous system

Haemorrhages of varying degree were frequent. Necrosis is due chiefly to lesions in the small vessels. The pulse in the larger arteries of the affected parts was usually palpable. There were 18 cases of peripheral infarcts or severe necrosis and gangrene but mild lesions associated with pains and sensory disturbances were common.

When the larger vessels were affected the lesions were usually thrombotic or embolic. About half of these were in the lower extremity.

There were eight cases of amputation for gangrene of the foot which occurred during the second or third week and was heralded by intermittent pains and a spotty blue grey staining of the skin. The onset was often insidious so that the diagnosis was liable to be delayed.

Emboli and thrombi were occasionally found in the largest arteries even in the aorta. The incidence of thrombosis was 0.3 per cent and of severe gangrene 0.1 per cent.

The occurrence of typhus as a complication of surgical conditions was common and diagnosis might be very difficult.

Special attention is called to the possibility that the blood in typhus fever may be infective up to eight days after defervescence. Smear infection through the mucous membranes and skin must be taken into account by surgeons during epidemics.

Although experienced Russian surgeons insist that persons who have had attacks of typhus are bad subjects for operations up to about four months after defervescence the authors have not found that the healing of wounds has been specially delayed or that wound infections have greatly increased during convalescence.

Disinfection under plaster bandages is a difficult problem. The bandages need not be removed for this purpose if the patient has been away from the infected region for 8 to 10 days.

Amputation for gangrene should be delayed except in cases of moist gangrene with alarming symptoms.

Convalescent serum is useful for restless and delirious patients with typhus.

In some cases appendicitis and ileus have been simulated.

The above are only a few of the points dealt with in this comprehensive study of the subject.

John H. D. Meade

OTTO R. & MAY K. H. Zur Frage der experimentellen Wertbestimmung von Fleckfieber Impfstoffen [Experimental Estimation of the Efficacy of Typhus Vaccines] *Ztschr f Hyg u Infektionskr* 1943 Nov 20 v. 125 No 3/4 299-307 '45 refs.]

Curious variations were found in the degree of immunity produced by similar doses of egg yolk vaccine administered by different routes. With certain lots of vaccine the results were better after subcutaneous injections with others the intraperitoneal route was more effective. In most of the tests the number of guineapigs inoculated was four or five by each route. Some lots of vaccine gave complete protection by both routes. One lot gave poor results by both.

Egg yolk vaccine prepared in America gave excellent protection against the Cracow strain of *Rickettsia* so did Giroud's lung vaccine and two types of louse vaccine.

In preparing their vaccine the authors do not use strains of *Rickettsia* that have been passaged more than 50 times through egg yolk.

They find guinea-pigs the most suitable animals for testing the vaccines—mice are more difficult to immunize and many of them died of intercurrent infections.

The titre of agglutination of *Rickettsiae* in vaccinated animals was not found to have a uniform relationship to the immunizing power of different vaccines. The relationship of Giroud's dermal reaction to the degree of immunity has still to be proved. *John W. D. McArthur*

DAVID W. A. L. *Fumigation as a Method of controlling the Body Louse Pediculus humanus corporis* de Geer Parts I and II *Bull. Entom. Res.* 1944 Apr. v. 33 Pt. 1 79-89 2 figs. [20 refs.] [Summary appears also in *Bulletin of Hygiene*]

In the epidemics of louse-borne disease during and after the war of 1914-18 hydrogen cyanide was the most widely used of fumigants for delousing. In spite of its high toxicity to lice and good penetration its poisonous nature and lack of warning odour render it very unsatisfactory for this use. A search for alternatives therefore seemed advisable.

Part I of this paper describes a laboratory method for determining the toxicity of liquid or gaseous fumigants to small insects like the body louse. The apparatus has the advantages of maintaining good control over physical conditions while being fairly simple to construct.

Part II gives a rough guide of the toxicity to lice of 20 substances selected as possible fumigants for delousing based on experiments with the apparatus described. In addition information is tabulated on the following points—boiling point specific heat of evaporation saturation concentration in air inflammability type of package availability odour warning properties and toxicity to man. Considering all these factors the following compounds were considered promising and selected for practical tests—methyl formate ethyl formate methyl allyl chloride trichloroacetonitrile ethylene dichloride and chloropicrin. The practical tests will be published soon. *J. R. Buxvine*

BERGE C. ALDOYE H. & FALCONNIER J. *Présence du typhus murin dans la région de Ferryville. The Occurrence of Murine Typhus in the Neighbourhood of Ferryville (Tunisia)* *Arch. Inst. Pasteur de Tunis* 1942 Dec. v. 31 No. 3-4 183-93 2 figs. [25 refs.]

Isolated cases of murine typhus, mostly unpublished, have been reported from various parts of Tunisia since 1933 when C. H. NICOLLE and H. SPARROW isolated three strains of murine *Rickettsiae* from 900 rats and two strains from 300 mice in the harbour region of Tunis.

Three cases are now described: they occurred in August and December 1940 in sailors employed by the harbour administration of the Port on the shore of Lake Bizerta. Rat infestation was intense in the place where the men were working.

The fever lasted 8, 9 and 12 days in the three cases; only one patient had a rash.

Murine *Rickettsiae* were isolated from the blood of two of the patients by direct guinea-pig inoculation. The two guinea-pigs inoculated with the blood of the third patient on the eighth day of the fever gave no reaction.

In December 1941 and January 1942 30 rats (*Rattus norvegicus*) were caught in the neighbourhood and murine Rickettsiae were isolated from the pooled brains of two of these by direct guinea-pig inoculation

John H D Megaw

SHAPIRO B G Tick Typhus following a Dog Scratch *South African Med J* 1944 Mar 11 v 18 No 5 83-4

A doctor in charge of a group of prisoners of war near Kokstad [south west of Durban] was vigorously scratched on the left leg by his dog. There was slight bleeding at the time and 50 hours later there was a rise of temperature to 101 F with painful lymphadenitis in the left groin. On the sixth day after the injury a maculo papular rash appeared and soon extended all over the body including the palms and soles. There was a moderate degree of generalized lymphadenitis and a necrotic patch resembling a tick bite was found at the site of the scratch. The fever ran a course of 13 days and was typical of tick bite fever.

Proteus OX19 was agglutinated at a titre of 1-80 on the 12th day and at 1-160 on the 15th day. *OX2* and *OXA* were not agglutinated at significant titres except for a partial reaction with *OXA* at 1-160 on the 15th day.

[The remarkably short incubation period of 50 hours is reminiscent of similar findings by DING (this *Bulletin* 1944 v 41 116) in his cases of louse borne typhus in which the patients had obviously been experimentally inoculated with the infective material.]

John H D Megaw

ANIGSTEIN L BADER M N YOUNG G & NEUBAUER Dorothea Protection against Spotted Fever by Specific Immune Serum Inoculated Intradermally at the Site of Infection *J Immunology* 1944 Jan v 48 No 1 69-77 9 charts [11 refs]

----- & ----- Investigations on Rickettsial Diseases in Texas Part 3 Spotted Fever Protection of Laboratory Animals by Intradermal Inoculation of Immune Rabbit Serum *Texas Reports on Biol & Med* 1943 v 1 No 4 371-88 [11 refs]

ANIGSTEIN (1936) had already shown that guinea-pigs could be protected against intradermal inoculation with the infection of louse borne typhus by infiltrating the skin at the site of the inoculation several hours beforehand with immune serum.

In the present experiments uniform doses of 0.1 cc of suspensions of [Rocky Mountain] spotted fever Rickettsiae were injected intradermally and varying doses of immune serum prepared from rabbits were injected into the skin at the same site either simultaneously or at varying intervals afterwards.

The results are shown in the following table prepared from the information contained in the paper. In all cases the potency of the infecting suspension was checked by using control guinea-pigs.

In six other guinea-pigs the infecting suspension was injected simultaneously with but at a different site from 0.4 cc of immune serum and five of the animals showed typical reactions.

Convalescent serum of guinea-pigs recovered from Texas spotted fever was injected simultaneously and at the same site with an infecting dose of suspension but did not prevent attacks in any of the four guinea-pigs tested.

They find guinea-pigs the most suitable animal for testing the vaccines—mice are more difficult to immunize and many of them died of intercurrent infections.

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Dose of immune serum in cc	Delay in injection of immune serum	Number of guinea pigs	Number reacting	Number later found protected
0.4	hours	not stated	Non	All
0.4	Nil	15	4	4+4
0.1	Nil	3	0	3
0.0	Nil	4	0	4
0.0-5	Nil	6	0	6
0.0-5	1-18 hours	0	0	(partial) 17
0.4	4 hours	5	0	(all that are available) 5
0.4	48 hours	4	0	3
0.4	Full day before onset of fever	3	3	(all that are available) 0

The reason for the failure of relatively large dose (0.4 cc) to give such complete protection as smaller doses is discussed. It was concluded that the anti-viral powers of the virus were completely neutralized by the excess of serum. With the smaller doses there was interception of the virus at the site but a partial escape of the altered virus then caused a symptomless immunizing infection.

This effect was produced by immune serum when it was injected at the site of the inoculation up to 48 hours after giving the infective dose. After 48 hours a sharp fall will already have occurred in the animal's temperature and this will be followed by a sudden onset of high fever even if immune serum is given during the time that the temperature is subnormal. This fall in temperature is a special feature of intradermal inoculation. It does not occur after intraperitoneal injections of the Rickettsiae.

The immune serum evidently causes a local immunity of the type emphasized by BESREDKA (1928).

John W. McDowell

ANGSTEIN L. B. & BADER M. N. & YOUNG G. Protective Effect of Separate Inoculation of Spotted Fever Virus and Immune Serum by Intradermal Route. S. 1943 Sept. 4. 35-6

This is a preliminary note of the work reported above.

ANGSTEIN L. & BADER M. N. Investigations on Rickettsial Diseases in Texas. Part 4. Experimental Study of Bull's Fever. Texas Reports on Biol. & Med. 1943 Vol. 1 No. 4. 389-409. 3 charts & 5 figs. (1 coloured)

This paper deals with an investigation into the cause of a new tick-borne fever first described in August 1943 by WOODLAND McDOWELL and RICHARDS under the name Bull's fever [See this Bulletin 1944 Vol. 41. 34-39].

The disease occurred at Fort Bullis in Texas among soldiers engaged in military exercises. About 1 000 cases have been observed 485 of these occurred in May and June 1943.

The fever lasts for 4 to 14 days. In some severe cases a maculo papular rash is pronounced leucopenia. The fatality rate is almost negligible though some of the attacks are severe. All the patients had been bitten by ticks and the affected locality was found to be infested with *Amblyomma americanum* which is a proved vector of spotted fever [American tick borne typhus] and has been found to be naturally infected with Q fever in Texas. Rickettsia like bodies had been found in peritoneal scrapings of guineapigs inoculated with the blood of patients also in the lymph nodes of patients and in the organs of laboratory infected Swiss mice. Guineapigs inoculated with patients' blood had been found to develop low fever for one or two days after an incubation period of 9-11 days.

In the present investigation five lots of 100 each of *A. americanum* collected in the affected area were triturated and a pooled suspension of each lot was used to inoculate six guineapigs.

The febrile responses of the animals were very varied. (a) fever for one day after 12 days. (b) febrile spells of one or two days recurring at intervals of three or four days. (c) continued high fever and (d) irregular and protracted low fever. In some cases the infection was inapparent. None of the animals died but the spleen was always enlarged and in some animals lung conditions were found resembling those seen in experimental spotted fever typhus and Q fever.

One strain was passaged 12 times all the above types of febrile reaction occurred in the guineapigs infected with this strain. Infection did not immunize guineapigs against spotted fever or Q fever but did cause immunity against guineapig strains of infection originating from the blood of patients who had Bullis fever.

In Giemsa stained smears from a guineapig of the fifth passage some large mononuclear cells contained masses of purple red organisms which were coccoid and bacilliform and were definitely Rickettsia like. Similar organisms were seen in other guineapigs.

The findings in guineapigs were very like those caused by infection with mite borne scrub typhus. The disease is regarded as a rickettsiosis of which *A. americanum* is the vector or at any rate one of the vectors.

This very interesting outbreak is of more than local importance. It serves as a warning that when bodies of troops are engaged in operations in areas infested by ticks or mites outbreaks of Rickettsial fevers transmitted by these arthropods may constitute a serious war risk.

Hitherto these fevers being transmissible only from lower animals to man and not from man to man have nearly always occurred as sporadic cases. But the war has introduced a new set of conditions in which large outbreaks can be expected.

In the whole of the Pacific area and in South East Asia numerous cases of scrub fever (mite borne typhus) are said to have occurred sometimes in the form of considerable outbreaks. The fatality rates are said to have been low in most of the outbreaks but they may some times be as high as 10 per cent and even when they are low the disease is likely to be of serious military importance.

The example of Bullis fever shows that the same kind of thing can happen in tick infested areas of which there are many in India, Africa and America.

In the mite borne fever the duration of the attacks—seldom less than eight days—and the high titre agglutination of *Proteus OXA* point to the correct diagnosis but the example of Bullis fever shows that some of the tick borne Rickettsial fevers may closely resemble dengue in being usually of 3-7 days duration in giving a negative reaction with the *Proteus* organisms in the pronounced leucopenia and in the negligible mortality.

Indeed prior to the announcement of the discovery of the Rickettsia these features suggested to the reviewer that Bullis fever might be a tick borne zootic fever belonging to the dengue group.

Pending further investigation of these fevers the important point is that medical officers should realize the risks that are run by troops operating in areas infested by ticks and mites.

The only precautions generally available at present are protective clothing and the use of repellents on the parts of the body exposed to bites.

In the case of ticks frequent search for these on the body and their immediate removal may be useful.

John H. D. McArthur

DENGUE AND SANDFLY FEVER

Nájera L. Los Phlebotomus de Getafe y la fiebre de pappataci. [The Sandflies of Getafe and Sandfly Fever] Bol Soc Esp Hist Nat Madrid 1943 v 41 No 56 281-8 3 figs [Summary taken from Rev Appl ed Entom Ser B 1944 Apr v 32 Pt 4 66-7]

Following an outbreak of a disease thought by the army doctors to be sandfly fever among troops in a military camp at Getafe in the summer of 1942 the author visited the site and collected 22 sandflies in various huts in about half an hour. He later received 17 more from the same source. The species represented were in order of decreasing frequency *Phlebotomus perniciosus* Newst, *P. minutus* Rond (*p. rroeti* var *talensis* Adl & Thdr) and *P. papatasi* Scop. He describes and figures the genital armature of the males and the wing and pharyngeal armature of the females of *P. papatasi*. The females taken all contained blood. Records of the alleged occurrence of sandfly fever in Spain are briefly discussed and it is concluded that though the vector *P. papatasi* is present the evidence for the occurrence of the disease is inconclusive since transmission experiments have not been carried out.

PLAGUE

Devignat R. Aeration of Fluid Culture Media. Supplementary Observations. Edinb Med J 1944 Mar v 51 No 3 14-30 [19 refs]

Aeration had earlier been found to result in loss of virulence [this Bulletin 1943 v 40 390-391] of the organisms subjected to this treatment. Some unexpected results obtained by the author when repeating his experiments have led him to abandon the hypothesis

that aeration *per se* was the real agency in this effect. In his new experiments he used quick lime (la chaux vive du marbre) instead of caustic potash for the removal of water and carbon dioxide from the air before bubbling it through the culture and to his surprise found that the virulence of *P. pestis* was not diminished. This finding leads him to the interesting thesis that the caustic potash used originally to remove carbon dioxide from the air conferred on it the radio activity of beta emanation and it was this that produced an avirulent organism. Lime did not confer any such property upon the air and so the organisms remained fully virulent. Some further experiments were done with hydrogen washed in caustic potash and the tetanus bacillus instead of the plague bacillus as the test organism. They enabled the author to obtain a non toxic strain of *Cl. tetani*. He would have wished to amplify these experiments and present more controls but has had to give them in their present tentative form on account of the limited means at his disposal at Blukwa in the Belgian Congo.

W. F. Harley

BURROUGHS A. L. The Flea *Malareus telchinum* a Vector of *P. pestis*
Proc Soc Exper Biol & Med 1944 Jan v 55 No 1 10-11

During a survey in the San Francisco Bay region *Pasteurella pestis* was found in pooled collections of fleas. In order to find the infected mammalian hosts 136 rodents were trapped and their ectoparasites identified. The rodents comprised the following: meadow mice (*Microtus californicus*) 952, deer mice (*Peromyscus maniculatus*) 347, brown rats (*Rattus norvegicus*) 40 and harvest mice (*Reithrodontomys megalotis*) 17. The details are shown in Table I —

TABLE I

Host	Species of flea
<i>M. californicus</i>	<i>Catallagia vonbloekeri</i>
	<i>Atyphloceras multidentatus</i>
	<i>Hystrihopsylla gigas dippiei</i>
	<i>Malareus telchinum</i>
	<i>Peromyscopsylla ebrui</i>
<i>P. maniculatus</i>	<i>Atyphloceras multidentatus</i>
	<i>Hystrihopsylla gigas dippiei</i>
	<i>Opisodasyx nesiotus</i>
	<i>Malareus telchinum</i>
<i>R. norvegicus</i>	<i>Catallagia vonbloekeri</i>
	<i>Malareus telchinum</i>
	<i>Opsopsyllus fasciatus</i>
	<i>Orchopeas sergenti</i>
<i>R. megalotis</i>	<i>Catallagia wrighti</i>

Since the flea *Malareus telchinum* was the only one found on all three species of rodent known to be naturally infected with *P. pestis* it was used for transmission experiments although previous attempts at transmission made by ESKEY and HIAS [this *Bulletin* 1941 v 38 324] with guineapigs and by WHEELER and DOUGLAS [this *Bulletin* 1942 v 39 616] with white mice had failed. The author used infected meadow mice, deer mice and white mice to infect the fleas and clean meadow mice for the infected fleas to feed upon. In 10 experiments four positive transmissions were obtained.

J. F. Corson

BACILLARY DYSENTERY

HUGHES W. Treatment of some Complications of Bacillary Dysentery
[Memoranda.] *Brit Med J* 1944 May 20 691

Sulphapyridine has certain advantages over sulphathiazole in the treatment of dysentery: the latter is costly, a large dosage is required and there is no soluble salt for parenteral injection in urgent cases. PAULLEY [this *Bullet* n 1943 v 40 241] found sulphapyridine somewhat more effective than sulphathiazole.

Hughes has used sulphapyridine in 200 cases of bacillary dysentery in Lagos, Nigeria, injecting it intravenously in adults and intramuscularly in children. The infections, which were nearly all caused by Flexner organisms, were often complicated by nutritional deficiencies: ariboflavinosis was very common in adults and infantile pellagra had a high mortality. Undiluted milk was given in sufficient quantity and in urgent cases a crude liver extract was injected. In simple cases the results were good. Notes of two African patients, one a man of 25 years, the other an infant of 5 months, are given. In the former case sodium sulphapyridine 1 gm. was given intravenously and 1 gm. every hour by mouth, while in the case of the infant 0.3 gm. of sodium sulphapyridine was given intramuscularly and sulphathiazole 0.5 gm. every hour was given by mouth. Rapid recovery followed in both cases.

J. F. Corson

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

FALLOT E. C. Some Modern Conceptions of Amebiasis. *Science* 1944 Jan 21 & 28 45-51 69-72 [73 refs.]

This article on the subject of amoebiasis is an address delivered by the author before the College of Physicians of Philadelphia on the occasion of the presentation to him of the Alvarenga Prize. It is a comprehensive review of recent observations and experiments on the behaviour of *Entamoeba histolytica* in its relation to human beings and other hosts which may be infected with it. In fact the article, which deals with all aspects of the subject, will repay careful study by anyone who is interested in the epidemiology, pathology, symptomatology and treatment of one of the most widespread of human infections.

C. M. Henson

SHIH LU CHANG. Studies on *Entamoeba histolytica*. III. Destruction of Cysts of *E. amoeba histolytica* by a Hypochlorite Solution, Chloramines in Tap Water and Gaseous Chlorine in Tap Water of Varying Degrees of Pollution. *War Medicine* Chicago 1944 Jan v 5 No 1 46-55 7 charts [17 refs.]

The experiments described in this paper were designed to throw light on the conditions under which hypochlorite solution and chloramines in tap water kill cysts of *Entamoeba histolytica* and those under which chlorine kills them in tap water polluted with sewage and proteose peptone. In the experiments a standard suspension of washed cysts in distilled water was used and this was added in measured amounts

to the tap water. After exposure to the reagents the iodine was neutralized with sodium thiosulphate and the cysts removed by centrifugation. They were then planted in tubes of liver infusion agar medium which had previously been inoculated with the bacteria from successful cultures of *E. histolytica*. It had already been shown that in this medium five cysts were sufficient to give rise to cultures. As in the experiments the inoculum to each tube contained between 4 000 and 5 000 cysts a negative culture result was an indication that 99.1 per cent of the cysts had been killed.

In a previous paper the author working with FAIR [this *Bulletin* 1942 v. 39: 313] has shown that the amount of chlorine required to kill cysts in water is reduced by half if the temperature is raised 20° F or the pH value is lowered from 7 to 6, is reduced 25 per cent if the contact period is doubled and is increased by 25 per cent if the pH value is raised to 9. It was also noted that in all these tests *Bact. coli* was destroyed before the cysts.

In the present paper it is shown that the cysticidal activity of the hypochlorite solution as well as that of the gaseous chlorine was greatly influenced by the hydrogen ion concentrations of the water. It is thought that the destruction of cysts depends on the amount of active or free chlorine and this is dependent again on the pH of the water. The higher the pH the lower is the amount of free chlorine. As regards chloramines it was found that efficiency was more than doubled and the required contact period reduced to one fourth when the pH was lowered from about 8.6 to 7. In the study of the effect of organic substances on the cysticidal efficiency of chlorine it was found impossible to make any generalizations for this varied with the physical and chemical nature of the organic substances and the amount of free ammonia present. It seemed however that soluble organic substances such as proteose peptone readily combine with active chlorine and thus decrease the efficiency of chlorine more than do those in the form of suspended solids. The effect of sewage on gaseous chlorine was complicated by the high ammonia content resulting in the formation of chloramines. In an attempt to obtain more accurate and uniform data the oxidation reduction potentials of the solutions were measured. It appeared that this gave a more accurate estimate of the cysticidal efficiency of chlorine compounds than did the concentration of residual chlorine. It seemed to indicate the amount of active chlorine irrespective of the pH and the amount of organic matter present in the water. The conclusion is that in order to be effective the chlorination of water for the destruction of cysts of *E. histolytica* must take into account all the factors that affect the dosage of the particular compound employed. The author does not give any precise indication of the substances or the doses which he employed for the destruction of cysts but he expresses a hope that the results of the study will permit of an orderly approach to the choice of an effective dosage.

C. M. Wenyon

PFANNER W. Weiterer Beitrag zum Amobenabszess der Leber
[Further Contribution on Amoebic Abscess of the Liver] *Munch
med. Woch.* 1943 Nov. 19 v. 90 No 46/47: 652-3

The author has met with 18 cases of amoebic abscess of the liver in Europe and has operated on 12 of them. In 8 of these the abscess was confined to the liver, being situated in the upper part in 6 and

near the edge in 2. In 3 cases the abscess had ruptured into the subphrenic area and in 1 into the pleural cavity as much as 5 litres of pus had collected in the subphrenic area in one case. In one the abscess ruptured into the peritoneal cavity and simulated a perforated peptic ulcer.

It is important to observe the blood after operation. If the leucocytosis persists it suggests either retention of pus or the presence of another abscess.

Recovery is astonishingly rapid after treatment of the abscess and of the intestinal infection. The body weight may increase by as much as 3 kgm within a week.

All the patients had amoebae in the stools but in only two were they found before the abscess was diagnosed. Seven of the patients had been doing military duties up to a short time before operation for the abscess and one even after the abscess had perforated into the subphrenic area. In the three fatal cases neither abscess nor amoebic infection had been diagnosed during life.

Small abscesses do not need to be opened. They will heal with treatment with emetine and yatren.

J F Corson

DAVID N A PHATAK N M & ZENER F B. Iodochlorhydroxyquinoline and Diiodohydroxyquinoline. Animal Toxicity and Absorption in Man. *Amer J Trop Med* 1944 Jan & Feb No 1 29-33 [11 ref.]

Examination was made of the toxicity of iodochlorhydroxyquinoline (Vioform N N R) and of diiodohydroxyquinoline (Diodoquin). When single doses are given by mouth the L D 50 (dose which kills 50 per cent of the animals) of Vioform is about 175 mgm per kgm in guinea pigs and about 400 mgm per kgm in kittens. With Diodoquin the percentage of deaths was not proportional to the dose so that no L D 50 could be determined but 20-40 per cent of both guinea pigs and kittens died after doses ranging from 50 to 2 000 mgm per kgm. [Presumably absorption of Diodoquin which is very insoluble is slight and the development of toxic symptoms will depend much more on variations in the amount absorbed than on the amount given by mouth.] In animals which died after either compound liver damage was found. The lesions resembled those of chloroform poisoning.

When the compounds were given by mouth to human volunteers (about 9 for each compound) in doses of 0.21-0.25 gm thrice daily for 10 days the iodine concentration in the blood (normally about 5-20 microgrammes per 100 cc) rose by 223 microgrammes (average) after Vioform was given and by 172 microgrammes (average) when Diodoquin was given. This is evidence that absorption of the compound has occurred to some extent. The absorption of Diodoquin was more irregular than that of Vioform. Some gastrointestinal discomfort was felt during the administration of these doses and some of the persons experienced pruritus ani.

It is concluded that Diodoquin is potentially more toxic than Vioform on account of its greater iodine content (and also because of the irregularity in its absorption). However the occasional toxicity which may occur in clinical practice should not preclude their use in the prophylaxis of amoebiasis if such therapy is rigidly controlled.

F Hawkin

CHALAYA L E [Intestinal Protozoa among the Population of Frunze (Kirghisia) and their Rôle in the Etiology of Summer Diarrhoeas First Communication] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 5 83-5 [In Russian]

The author notes that in the medical reports for Kirghisia (Central Asia) amoebiasis is not mentioned in spite of the prevalence of various intestinal diseases. When occurring in children under the age of two these are recorded as infantile diarrhoea or gastro enterocolitis while the disorders in adults are attributed to bacillary dysentery and infectious haemorrhagic colitis. With the view to determining the rôle of intestinal protozoa in the aetiology of some of these conditions the author made a survey of the population of Frunze. The total number of persons examined was 800 belonging to various age groups. The incidence of intestinal protozoa amounted to 63 per cent distributed as follows: *Entamoeba histolytica* (cysts) in 20.6 per cent [13 per cent with the large race 7.6 per cent with the small race (= *E. hartmanni*)] *E. coli* 38 per cent *Iodamoeba* 32 per cent *Endolimax* 15 per cent *Giardia* 12 per cent *Chilomastix* 10 per cent *Dientamoeba* and *Trichomonas hominis* in single cases.

The number of carriers of *E. histolytica* was highest among children from 10 to 14 years old (35 per cent) and lowest among infants under the age of three (3.4 per cent). Among adults 20 per cent of the workers engaged in food production proved to be infected with this parasite. The incidence of giardiasis was particularly high in infants under the age of three (22 per cent). In view of the unsatisfactory sanitary conditions and unfavourable epidemiological factors existing in Middle Asia the author urges the necessity of further investigations on the pathogenicity of intestinal protozoa especially of *Giardia* which is suspected of being responsible for infantile diarrhoeas. She also recommends repeated examination of food workers for *E. histolytica* followed by treatment of carriers among them. C A Hoare

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

PAVLOVSKY E N A New Vector of the Tick Relapsing Fever *Ornithodoros nereensis* Pavl in Turkmenia *C R Acad Sci URSS* (NS) 1941 v 31 No 4 408-10 1 fig [Summary taken from *Rev Applied Entom* Ser B 1944 Apr v 32 Pt 4 70]

A description is given of the adults of both sexes of *Ornithodoros nereensis* sp n which was found together with two other species of *Ornithodoros* in the Karakala region of south western Turkmenistan in 1931. It occurred among stones in crevices in the walls of huts and in shallow burrows inhabited by mammals reptiles or birds. Relapsing fever appears to be of rare occurrence in this district and none of the ticks taken in 1931 showed evidence of natural infection with spirochaetes but examples of *O. nereensis* taken in 1936 transmitted spirochaetes to mice and also to man when used in experiments on the treatment of progressive paralysis by induced relapsing fever.

ROBINSON G G The Stability of Rotenone in a Phenol Oil Solution
Bull Entom Res 1944 Apr v 35 Pt 1 1-2

In solutions of some organic solvents rotenone changes by oxidation to various derivatives giving a yellow colour and a loss in insecticidal power. A recent paper by this author [this *Bulletin* 1943 v 40 243] described an insecticidal combination of 60 per cent Shell Oil P31 15 per cent ground nut oil 25 per cent phenol and 1.5 per cent pure rotenone. This solution was tested after a year's storage in ordinary reagent bottles kept in the dark but with ample access to air. The test animal was the tick *O. nitidus moubati*. The experiments showed that the oil solution was fully as toxic as one newly prepared.

J R Busvine

UHLENHUTH P Die Maus als Leptospirenträger zugleich ein Beitrag zur Frage der Blutdifferenzierung verschiedener Mausearten [The Mouse as a Carrier of *Leptospira* together with a Study of the Problem of the Blood Differentiation of Different Mouse Species] *Ztsch f Immunitätsf u Exper Therap* 1943 Dec 11 v 104 No 7/8 338-55 [2 refs]

An interesting summary of the position of field mice including two or three allied species as carriers of leptospiral infection.

The author finds that in Germany field mice are carriers of mud or field fever and that *Leptospira interrogans* is the usual infective organism. The disease is primarily a mouse infection and there is no evidence for the existence of an exogenous stage of the infection. When various species of mice have become carriers of leptospiral infections there seems to be a general tendency, especially in Italy, for each of the various types of *Leptospira* to become attached to some particular species of rodent. The author's investigations support the view that the mouse is not such a universal source of infection as the rat with *L. icterohaemorrhagiae*.

It does not seem possible to establish a stronger parallel between the study of Muridae and mud or field fever. Different species of mice vary considerably in their susceptibility to *Leptospira* and the author gives a table showing the species of rodents that have been found infected with the organisms.

Finally details are given of precipitin reactions with field mouse (*Microtus arvalis*) and ordinary white mouse antisera prepared by injecting rabbits with the blood of these two species.

Microtus arvalis antiserum was found to give precipitin reactions not only against the same species but also against *Microtus agrestis*, *Clethrionomys glareolus* and less strongly against *Apodemus sylvaticus* and *A. flavicollis* but was completely negative against the white mouse and house mouse. White mouse antiserum on the other hand reacted not only with the blood of the house mouse and white mouse but also with that of *Clethrionomys glareolus*, *Apodemus sylvaticus* and *Apodemus flavicollis*.

[The author gives only the common German names for the various rodents in his table showing the results of the precipitin reactions. The specific identifications above have been made from Brehm's Tierleben.]

E Hindle

SCHUFFNER W & BOHLANDER H Ueber den verschiedenen Verlauf des durch Leptospiren hervorgerufenen Nierenprozesses bei Feldmaus und Ratte [Various Details of the Kidney Changes in Field Mice and Rats Infected with *Leptospira*] *Ztschr f Immunittsf u Exper Therap* 1943 Dec 11 v 104 No 2/5 237-43 3 figs

It is characteristic of all known pathogenic leptospirae for the organism to appear in the kidney and urine at an early stage of the infection. They may begin to appear by the 7th day or not until the 20th. The organisms settle in the epithelium of the convoluted tubules and build up colonies from which the infection gets into the urine and may persist for long period.

The authors find that field mice [presumably *Microtus arvalis*] infected with *L. grippolyphosa* show a similar type of kidney infection to that in rats infected with *Leptospira uterohienorrhoeae*. In both there is the establishment of a pure culture of the organism but whilst in the rat the infection generally persists for life in the field mouse the infection is much more intense and rarely persists for longer than one month. As a result Weil's disease is more endemic than mud fever or field fever which appears in relatively short summer or autumn epidemics. Other factors also contribute to the spread of the infections flooding agricultural labour or mouse bite in the case of field fever and swimming and bathing in Weil's disease.

Finally the authors consider that in epidemiological studies examination for leptospira is preferable to serological tests as it gives much more reliable results.

F Hindle

MACHADO GONZÁLEZ A Contribución al estudio del sodoku en Venezuela [Rat-Bite Fever in Venezuela] *Bol. Hospitales Caracas* 1943 Sept Dec v 42 Nos 5-6 271-90 [10 refs]

This is a thesis presented for the Doctorate of Medicine at the Central University of Venezuela. The only part not already to be found in the usual textbooks is that recording the history of the disease in Venezuela and notes of four cases. What is known about rat bite fever in that country may be said to date from 1924 when Dr TEJERA [this *Bulletin* 1925 v 22 180] reported that in examining rats prior to experimentally inoculating them with *P. pestis* he found some with enlarged glands in the neck and groin and the spirochaete in the blood and he was able to transmit infection to the guinea-pig. It was then found that 10 per cent of rats examined in Caracas were harbouring the spirochaete and there is little doubt that for some time perhaps years among cases of continued fever of uncertain origin some at least were due to this infection. In 1937 Dr HERNÁNDEZ ZOZAYA observed a case in an infant but apparently the first to be published in Venezuela was one by GARCIA DIAZ in 1939. The four cases recorded by the author were in a child of six weeks, a boy of eight years, a girl of six years and a woman of 27 years. The history was clear in each instance.

H Harold Scott

HELMINTHIASIS

COLLIER H B & ALLEN D E The Haemolytic Action of Phenothiazine Derivatives Reprinted from *Canadian J Res* 1942 Oct v 20 D 283-90 1 fig [29 ref]

Anthelmintic doses of phenothiazine are relatively non toxic to sheep but have caused haemolytic anaemia in horse and in man and at least one human subject has died after their administration [see this *Bulletin* 1943 v 40 932 933] Collier and Allen have failed to find any direct haemolytic action of the phenothiazine derivative phenothiazone on the erythrocytes of horses *in vitro*. They have now however shown by the technique of PONDER (*J Gen Physiol* 1941 v 25 247) that some of the soluble derivatives of phenothiazine accelerate the haemolysis of red cells which is produced by lysins such as saponin and lysolecithin. They suggest that this accelerating effect may explain the haemolytic anaemia which occurs when phenothiazine is given to some species of animals.

For the detail of the technique used the paper must be consulted. The time required for a 50 per cent haemolysis of washed red cells by a known amount of lysin (saponin or lysolecithin) was first determined and then the time required for a 50 per cent haemolysis by the same amount of lysin in the presence of the phenothiazine derivative to be tested. The derivatives tested were phenothiazone, thiazine S-methyl sulphonium perchlorate, N-methyl phenothiazine, the conjugate potassium leucophenothiazone recovered from the urine of sheep and horses to which phenothiazone had been given and synthetic conjugate made by the method of BURKHARDT & LAPWORTH (*J Clerg Soc* 1926 6-4). None of the tested derivatives alone caused any haemolysis.

It was found that *in vitro* the haemolysis of horse erythrocytes by saponin or lysolecithin was powerfully accelerated in the presence of phenothiazone, thiazine S-methyl sulphonium perchlorate and especially the urinary conjugate potassium leucophenothiazone sulphate. The authors have observed in the plasma of horses a concentration of this conjugate which is sufficient to cause *in vitro* a very marked acceleration of the haemolysis. The conjugation of leucophenothiazone to the sulphate is a detoxifying mechanism but may in the light of these experiments actually intensify the haemolytic effect. The conjugate potassium leucophenothiazone sulphate is also believed to be the derivative of phenothiazine which is present in the blood of treated sheep (COLLIER *Canadian J Res* 1940 v 18 D 212). Phenothiazone and thiazine S-methyl sulphonium perchlorate are also powerful chloesterinase inhibitors (COLLIER and ALLEN *Canadian J Res* 1942 v 20 B 189). In the presence of the accelerators the anti-haemolytic effect of the anti-haemolytic substance present in normal serum was exerted. Sheep red cells are more resistant to haemolysis and to its acceleration by these derivatives. About three times the concentration of saponin was required to obtain the same rate of haemolysis as in the horse red cell and the acceleration produced by the phenothiazine derivatives was appreciably less. Horse red cells were lysed by 0.06 per cent of sodium choleate but phenothiazone had little accelerating effect on this.

Phenothiazone did not produce a photodynamic haemolysis such as that demonstrated by BLUM *et al* (*J Cell Comp Physiol* 1937

v 9 217) in the presence of dyes such as rose bengal. Large and repeated doses of phenothiazine given to rabbits and guinea-pigs kept on a diet relatively free from vitamin B complex failed to produce any significant anaemia [cf SCHWITZER, SIEBENMANN and BETT this *Bulletin* 1942 v 39 862] G Lapege

PLAZA IZQUIERDO L. La esplenectomia en las formas hepato esplenicas de la Bilharziosis Mansoni [Splenectomy in Hepato-splenic Forms of Schistosomiasis mansoni] *Rev Policlínica Caracas* 1943 Sept Oct v 12 No 72 280-306 4 figs [13 refs]

An M.D. thesis for the Central University of Venezuela. The author divides cases of infection by *Schistosoma mansoni* into two main groups: the hepato-intestinal and the hepato-splenic, and the latter he calls the Banti form (Banti-Bilharziosis). In Venezuela the author maintains Banti's disease is nearly always due to *S. mansoni*, the infestation being mainly, perhaps entirely, due to male worms. The diagnosis is made from the histological changes or from biopsy examination of the liver; for it is stated neither the parasite nor its ova are found in the spleen, the eggs being rapidly destroyed by the reticulo-endothelial phagocytes in the spleen. The enlargement may be due to perisplenitis, to infarction or to portal obstruction. There is usually some degree of anaemia with leucopenia, in part due to hypomyeloid (inhibition of the haematopoietic function of the bone marrow). The best time for splenectomy is the early stage, but benefit may result in the late secondary or even tertiary stages. The technique of the operation is described. The results are cessation of haemorrhage, improvement in the blood state and the general condition. Two cases are detailed from the author's records of twenty. Six deaths occurred ascribed respectively to myocarditis, to haemorrhage from pylophlebitis six days after the operation, to uncontrollable haemorrhage during the operation due to breaking down of multiple adhesions to blood transfusion which set up convulsions in which death took place, to internal abdominal haemorrhage and to intestinal obstruction with signs of peritonitis. H Harold Scott

MORENAS L. Les reactions d'allergie cutanee dans la distomatose humaine a *Fasciola hepatica*. cuti et intra dermo reaction [Cutaneous Allergic Reactions in Human Distomiasis due to *Fasciola hepatica*. Scratch and Intradermal Reactions] *C R Soc Biol* 1943 Sept v 137 No 17/18 563-5

In each of two families in the Roanne region two members were infested with *Fasciola hepatica* and the others were suspected of having this infestation. There was an eosinophilia of 6-51 per cent. Antigen was prepared from washed, dried and powdered freshly collected *F. hepatica* of the ov. For the scratch reaction this powder was incorporated in glycerin. For the intradermal reaction 1 gm. of the powder in 10 cc of physiological saline was evaporated by heat to half its volume and 10 cc of glycerin were added to this. The whole was brought to the boil and diluted again with physiological saline to make a 1:100 extract. This is the technique of SIEVERS and OYARZUN [this *Bulletin* 1932 v 29 745] for their work on sheep infested with *Fasciola*. Scratch and intradermal tests were done on seven members of one family and on five of the other and on 12 controls (three healthy and

nine suffering from various diseases including one with *T. sainata* and one with *Echinococcus* of the liver and peritoneum. The scratch reaction done by scarification of the upper third of the arm was considered positive when the result was urticarial swelling on the scratches within the first hour and strongly positive when the urticarial tracks became confluent to form a plaque. The intradermal reaction done by injection 0.2 cc of the extract into the skin was considered positive when 10 minutes after the injection there appeared an extension of the papule which acquired an urticarial look and an erythematous halo with infiltration into the subjacent skin.

In the first family the intradermal reaction was positive in all six of the seven members. The eldest son who did not live with them was negative. It was more marked in the two members convalescent from fluke infestation. The scratch reaction was positive in four members, two of these being the two infested with fluke and negative in the other three among whom was the eldest son.

In the second family the intradermal reaction was positive in all the five members and more marked in the two convalescent from fluke infestation. The scratch reaction was also positive in all five.

Of the 17 controls all were negative to the scratch reaction. The intradermal reaction was negative in 8 and doubtful in 4. It was thus negative in the two who had *T. sainata* and *Echinococcus*. This suggests that the test is specific to Trematodes and possibly to *F. hepatica*.

The author thought that the doubtful reactions might be due to the glycerin or to excessive concentration of the extract. Two new antigens were therefore made: one at a dilution of 1:200 in Coca's solution [a buffered saline solution with 0.5 per cent phenol] and one at 1:1000 in physiological serum [saline with the addition of 1:3000 of Sunoxol (Quinosol or Chinosol)]. All the controls who gave doubtful reactions with the extract first used were frankly negative to these second extracts, but it was not possible to test the persons infested with flukes. The scratch reaction is in the author's view less sensitive but more accurate than the intradermal and he recommends the use of both to ether.

G. Lapage

10. BOVSDORFF B. On the Remission after Removal of the Worm in Pernicious Tapeworm Anemia in Presence and Absence of Extrinsic Factor in the Food. *Diphyllobothrium latum* and Pernicious Anemia VI. *Acta Med Scandinavica* 1943 v. 116 No. 1 77-95 12 figs.

In an earlier paper (*Acta Med Scandinavica* 1940 v. 105 516) the authors showed that in patients with pernicious anaemia who were infected with *D. latum* the expulsion of the worm usually resulted in a reticulocyte response and rapid blood regeneration so that the anaemia in such cases can be regarded as due to the parasite. The implication of this result is that the patients have all the ingredients for the endogenous production of the antianaemic principle and that Castle's intrinsic factor is available. The author gave direct proof of this in another paper (*Acta Med Scandinavica* 1940 v. 105 540). Castle's theory, however, requires the interaction of the intrinsic factor with an extrinsic factor in the food. Presumably the latter was present in the food of the patients previously studied who were on the usual hospital

diet which contained milk meat and other animal products. In this paper the author records the effects of the elimination of these from the patients diet.

All the patients were young aged 20-41 years and most of them were soldiers. The eggs of *D. latum* were found in the faeces of all of them. Immediately on admission they were given a diet presumably free from Castle's extrinsic factor or at any rate poor in it (carbohydrates fat and vegetables). After some days the worm was expelled and the same diet was continued for 12-18 days which is long enough to enable a reticulocyte response and the beginning of blood regeneration to appear if the absence of the extrinsic factor makes no difference. On a mixed diet the author found (*Acta Med Scandinavica* 1940 v 105 516) that an increase of reticulocytes begins 4-6 days after expulsion of the worm and its peak is reached in 7-13 days; regeneration of red blood cells begins immediately after expulsion of the worm.

In the patients here described from whose diet the extrinsic factor was presumably absent the author usually found that there was no increase of reticulocytes even 15 days after expulsion of the worm and that there was no increase of red blood cells. In some cases the red blood cell curve fell so much that the experiment had to be stopped and the patient had to be given a mixed diet or injections of liver extract. Such cases are omitted from the results here given.

As soon as substances supposed to contain Castle's extrinsic factor were given a rapid change occurred. There was a strong reticulocytosis and blood values were improved. This happened when any one of the following substances was restored to the diet: meat, milk, casein, commercial peptone, brewer's yeast, concentrated yeast extract and to a lesser degree soya bean.

The 12 cases are briefly described and the paper is illustrated by graphs. A table gives the details of the blood picture. [See also this *Bulletin* 1940 v 37 215 & 216] G. Lapage

DE MEILLON B & LAVOPIERRE M. South African Creeping Eruption. *South African Med J* 1944 Apr 8 v 18 No 7 115-16 1 fig.

Faeces of South African dogs which contained many hookworm ova were mixed with charcoal and water and kept in a covered dish. On the 13th day filariform larvae appeared and about 50 were placed on the left arm of a volunteer and kept there for about 20 minutes. No pricking sensation was felt. On the following day, December 25th 1943, a small red spot appeared on the skin and the place itched. The spot had grown to a dull red papule about 10 mm wide by December 26th and on December 28th there was an erythematous serpiginous eruption over one inch long with tiny vesicles. Itching was intense at night or when in a hot bath. During the next few days there was little change but on January 4th a new tunnel appeared. The lesion was typical of creeping eruption or sand worm eruption as seen in South Africa. No attempt was made to identify the worm but the common hookworms of South African dogs are *Ancylostoma brahitiense* and *A. caninum*.

MURRAY [this *Bulletin* 1940 v 37 229] attributed his cases of sand worm eruption to mites which he found in the lesions. The

present authors examined these mites and concluded that they were not the cause of the eruption but were merely present accidentally
J F Corson

- i SMITH D C The Treatment of Creeping Eruption with Sodium Antimony Biscatechol (Fuadin) *J Amer Med Ass* 1943 Nov 13 v 123 No 11 694-5
- ii RUBIN S S Creeping Eruption [Correspondence] *Ibid* 1944 Mar 4 v 124 No 10 668
- iii BLANK H Use of Fuadin in Creeping Eruption [Correspondence] *Ibid* 1943 Dec 11 v 123 No 15 989-90

i Creeping eruption has been attributed to the larvae of flies and intestinal parasites in the United States the common cause is the larva of the dog or cat hookworm Freezing or cauterization of the skin at the site of the parasite is usually successful in curing the condition the author reports a case in a small child who had multiple infection where freezing was impracticable He decided to try Fouadin and recommended intramuscular injection of 2 cc of a 6.3 per cent solution daily for five days followed by an interval of one week and a repetition of the course By the third injection of the second course all signs of the infection had gone and the injections were discontinued

ii Rubin reports another case successfully treated with Fouadin in a man in whom 37 distinct active tracks were seen.

iii. On the other hand Blank reports failure of the treatment in a patient with about 50 severely pruritic linear lesions In this case biopsy revealed one of the parasites probably the larva of *Ancylostoma b. a. l. e. s. e.* The best results were obtained by freezing with ethyl chloride
Charles Wilcocks

- SOIMER E Askariasis und eosinophiles Lungeninfiltrat [Ascariasis and Lung Infiltration with Eosinophilia] *Schweiz med Woch* 1943 Sept 18 v 73 No 38 1132-7 5 figs [29 refs]

During the last 10 years the group-name atypical pneumonia has been used to include all kinds of transient infiltrations of the lung which are not tuberculous and are not classical pneumonia Among these are Löffler's syndrome pseudosyphilitic pneumonias infiltrations ascribed to Bannier's bacillus and to viruses and others which are regarded as being allergic asthmatic or due to *Ascaris* infestations Löffler's syndrome (LÖFFLER *Schweiz med Woch* 1936 v 66 1069 see also *Lancet* 1941 March 22 387) has a typical brief course lasting 1-3 weeks with a slight initial rise of temperature and scanty yellow sputum The infiltration can be studied by X-ray examination and when this shows that it has reached its maximum density the blood shows a marked leucocytosis with a relative lymphopenia and a gradual rise in the number of the eosinophils which reaches its maximum on the third to the eighth day of the illness This lag of the eosinophilia behind the clinical signs is characteristic There is no shift to the left and this fact is useful in the differential diagnosis from pneumonia The blood sedimentation rate does not show uniform changes but there is usually a marked rise in it After 1-3 weeks all the signs disappear and the X-ray shadows have usually gone before the blood returns to normal

The author agrees with the view that this eosinophil infiltration is an allergic reaction of the lung It can be produced by various allergens

(*e.g.* pollens) The same allergens which cause urticaria in sensitized persons in whom the skin is the reacting organ may also cause eosinophil infiltration of the lung in sensitized persons in whom the lung is the reacting organ. There is, the author thinks, no clear evidence that there is a tuberculous cause of eosinophil infiltration of the lung.

Contrasting the experiments of KOINO [this *Bulletin* 1923 v 20 235] and MULLER (*Beitr Klin Tbk* 1938-9 v 92 254) who both infested themselves by the mouth with *Ascaris* eggs Sommer concludes that Koino suffered from a pneumonia caused mechanically by the migration of large numbers of *Ascaris* larvae from the 2 000 eggs which he swallowed: he was probably not sensitized to *Ascaris* did not observe yellow sputum and had a condition markedly different from eosinophil infiltration of the lung. Muller on the other hand swallowed only a few *Ascaris* eggs: he had previously had an eosinophil infiltration of the lung [the possible cause of this is not stated or discussed] and was probably sensitized to *Ascaris*: he had the typical clinical picture of eosinophil infiltration of the lung (maximum blood eosinophilia 19 per cent on the seventh day): no larvae were however found in his sputum and Muller concluded that a few larvae could cause eosinophil infiltration and that they would not be found by ordinary sputum examinations. Sommer thinks that Muller's eosinophil infiltration was an example of the anaphylactic release of this syndrome in a sensitized subject by infestation with only a few larvae. These two types of lung condition due to *Ascaris* infestation must be differentiated and there may be mixtures of the two types. There is, he thinks, some support for this theoretical view in the view of FLURY (*Arch Exper Path u Pharm* 1912 v 67 275) that the toxicity of *Ascaris* is especially due to aldehydes of the fatty acids and he cites the fact that BORCHARDT [this *Bulletin* 1929 v 26 986] produced experimentally an eosinophilia with aldehydes. When *Ascaris* sensitivity exists—and it can exist for years—there may be several exciting causes of eosinophil infiltration of the lung. If the person is sufficiently sensitive the swallowing of a single *Ascaris* egg may be enough to release an anaphylactic eosinophil infiltration. This infiltration is similar to the urticaria of persons sensitized to various allergens including *Ascaris* material. [It is not clear whether the author thinks that in persons sensitized to *Ascaris* other allergens such as pollens may release an eosinophil infiltration of the lung or *vice versa*.] Sommer proposes to call the condition eosinophil anaphylactic pneumonia.

In support of his view he describes in detail the symptoms of a woman aged 35 who had tuberculosis of the *left* lung: tubercle bacilli were found. In June the blood count was normal except for a lymphocytosis of 39 per cent. The blood sedimentation rate was 4-5 mm Westergren average. In August the sputum was colourless. In September conjunctivitis and in November swelling of the eyelids appeared followed by a slight rise of temperature and severe headache with a markedly labile psychic state. A ray examination revealed a wedge shaped infiltration in the *right* upper lobe of the lung which resembled pneumonia. The amount of the sputum was much increased and in it there were yellow portions seen only in the fresh sputum which contained masses of eosinophils and many Charcot-Leyden crystals. These yellow portions were strongly benzidin positive while the rest of the sputum was not. The Berlin blue test was negative. The blood picture was now typical of eosinophil infiltration of the Löffler type *i.e.* there was a marked leucocytosis with a relative

lymphopenia and a lowly increasing eosinophilia which reached its maximum of 13 per cent on the fourth day of the illness and then fell at a uniform rate. Leucocytosis reappeared in the second week. By the 16th day all the symptoms had disappeared except the head ache. On December 6th however there was again a slight rise of temperature (39.5) which quickly fell again. The sputum was again increased in quantity and somewhat yellow and contained eosinophils and Charcot Leyden crystals (less abundant). Marked headache and an eosinophilia of 20 per cent were accompanied by signs suggesting tuberculous meningitis but these meningeal symptoms especially the almost epileptiform convulsions suggested an *Ascaris* infestation. No *Ascaris* eggs were however found after repeated examinations. The patient refused a lumbar puncture. Cf. CAETANO DA SILVA Jr & FLORES (this Bulletin 1944 v 41 501) who record a case with symptoms suggesting acute tuberculous meningitis in which the cerebrospinal fluid showed no indication of meningitis and the symptoms disappeared when the patient spontaneously voided about 9 *Ascaris*.

VOX MEYENBURG (Cancer Med Week 1942 v 72 809) has shown that eosinophil infiltration of the liver and epididymis may also occur and it is possible that it may occur in the meninges. The second attack may have been of this nature with a light diffuse reaction in the lungs. The temperature and blood picture were as before although the blood sedimentation rate reached 21 mm. Again there was the recurrence of the leucocytosis in the second week. Bellerger and calcium injections improved the meningeal symptoms. SOGEMEYER (Munch med Woch 1935 v 82 669) has observed the almost specific action of calcium on symptoms due to worm allergy.

During the succeeding week two milder eosinophilias appeared (13 and 9 per cent) both associated with slight rises of temperature and symptoms ascribed to worm infestation but the lungs remained unaffected. A emulsi given later expelled a single adult male *Ascaris*. From that date all the symptoms which were still present but mild disappeared suddenly and the blood rapidly became normal. Sommer suggests that a single *Ascaris* had caused an anaphylactic pneumonia in a patient previously sensitized.

To find out whether the patient was in fact sensitized Sommer prepared an ointment containing antigen from a human *Ascaris* and rubbed this into the skin below the collar bone of the patient from whom the *Ascaris* was obtained and also onto the skin of others including some known worm carriers without symptoms of infestation and persons who had had *Ascaris* infestation. The reaction of all these was negative. It was also negative in a person who had not had *Ascaris* but had had for three years in succession a seasonal eosinophil infiltration of the lung (in May) which was assumed to have not been an *Ascaris* pneumonia. When however this ointment was rubbed into the skin of the patient under consideration it caused, in 10 minutes, a marked strongly itching immediate urticaria a photograph of which is reproduced. Within an hour this had disappeared.

A 6.5 per cent solution of the antigen in carbol saline was then injected into the skin. A local immediate reaction followed and also typical anaphylactic shock with generalized and strongly itching urticaria which persisted for a long time. The severe symptoms are described in detail. The temperature was subfebrile throughout but the blood picture was again like that found during the previous eosinophil infiltration. The eosinophilia reached a maximum of 8 per cent, the

blood sedimentation rate was not affected. Five hours after the injection there was hardly an eosinophil to be found among 500 cells they had almost completely left the circulating blood. The author refers to a host of others who noted outwandering of eosinophils from the blood to the bronchial tissues in asthma and to the finding at autopsy by DEAN and WEBB (*J Path & Bact* 1924 v 27 51) of eosinophils in the periportal tissues of the liver in a case of anaphylactic shock. In his case Sommer regards the shock as atypical. dyspnoea and circulatory weakness were less evident than the colic vomiting diarrhoea and general prostration. Remarking that it is known to be difficult to produce anaphylactic shock in tuberculous animals he suggests that in his patient the tuberculosis may have damped down the shock.

Attempts were also made to produce eosinophil infiltration of the lung in this patient by direct inhalation of the allergen into the lung and apparently they succeeded.

The effects of the skin test show how dangerous such tests may be in sensitized patients and medical men are warned of this. The percutaneous ointment test is however suitable for general use for the diagnosis of *Ascaris* sensitivity (not for *Ascaris* infestation) and is simple harmless and convincing. [Cf ALWALL (this *Bulletin* 1944 v 41 425) on the pathology aetiology and treatment of Löffler's syndrome. CLAVEAUX *et al* (this *Bulletin* 1944 v 41 501) on Löffler's syndrome and trichiniasis. VENZANT QUINTANA (this *Bulletin* 1940 v 40 400) on Löffler's syndrome and *Necator americanus* and this *Bulletin* 1941 v 38 538.]

G Lapaque

SCOTT J G Ocular Syndrome in Onchocerciasis *Brit Med J* 1944
Apr 22 553-4

The author describes two cases of infestation with *Onchocerca volvulus* one of which is believed to be the first case of onchocerciasis in a Gambian. The symptoms observed were proptosis oedema of the upper eyelid ciliary flush and oedema of the optic nerve. The author suggests that the syndrome was due to an anaphylactic oedema caused by *O. volvulus*.

The first subject a Gambian soldier was admitted to hospital with painful watering of the right eye which began the day before admission. Vision was 6/5 R and 6/5 L. There was slight ciliary flush in the right eye but the media were clear and the fundi normal. The next day the right upper lid was swollen and there was slight proptosis. General examination revealed no abnormality. Day and night blood films showed no microfilariae but a triple centrifuged specimen of blood revealed a few *Acanthocheilonema perstans* which is very common in West Africa. no microfilariae were found in a snip of conjunctiva. The Kahn test was positive a common finding in a jaws infected population. After five days the proptosis became less but the right fundus showed blurring of the disk and next day vision was 6/36R and 6/6L. The lower half of the right disk was covered with exudate. Oedema of the right upper lid and the proptosis gradually faded during the next 15 days but the right fundus slowly developed a low grade oedema with swelling of the nerve head of 1 or 2 dioptries. The upper temporal

veins became veiled with exudate with a few flameshaped haemorrhages round the disk at 10 and 7 o'clock. The macula remained normal till the 13th day when it developed a complete star reflex. By the 33rd day the right fundus was returning to normal. The patient had been treated with atropine and heat to the right eye. On the 60th day the vision was 6/30 R and 6/30 L the haemorrhages had been absorbed and only slight fulness of the upper lid remained. On the 70th day a slit lamp became available and with it one microfilaria was seen in the right and left anterior chambers. There were no microfilariae in day and night blood films. From this time until the 90th day microfilariae were seen on most days in both eyes and on this day the patient was discharged with the right fundus normal. A course of NAB given to him was by then finished. Later it was possible to withdraw a microfilaria from the anterior chamber and this was found on staining to be *O. volutus*. These microfilariae were also found in a skin snip although no nodules could be felt. The right eye showed one fresh yellow speckled opacity in the cornea which the author has seen only in cases of onchocerciasis. Five and seven months later the patient was well and had no trouble with vision or pain in the eyes although microfilariae were present in each anterior chamber. Except for the faintest veil of the margins of the right disk the fundi were normal.

The second case was admitted with a painful swelling of the right axilla which was incised and cleared. A mild oedema of the right upper eyelid and ciliary flush developed into oedema which closed the right eye and proptosis appeared. Both fundi remained normal. Vision fell during 10 days from 6/9 on admission to 1/60. General examination gave normal results. Day and night films showed scanty *A. persians*. Many microfilariae of *O. volutus* were found in a skin snip and there were typical nodules over the right and left iliac crests. No microfilariae were seen in either anterior chamber. By the 27th day vision was 6/30 R and 6/30 L. The right fundus was normal throughout so that the neuritis in this case was retrobulbar. The author says that no single finding was sufficient to establish the diagnosis but the oedema of the upper eyelid the proptosis ciliary flush and optic neuritis indicated a lesion behind the eyeball the probable causes of which are haemorrhage tumour infection and congestion. The absence of subconjunctival ecchymosis excluded haemorrhage tumour was improbable because of the lack of other signs and the complete recovery infection (orbital cellulitis or cavernous sinus thrombosis) was unlikely. Against orbital cellulitis were the lack of any history of earlier sinus trouble the normal white cell count and the healthy appearance of the orbit on X-ray examination. Against cavernous sinus thrombosis was the absence of any primary lesion on the face or in the mouth. The unilateral optic neuritis might suggest syphilis but this was improbable because of the absence of choroidal changes and unequal pupils and the negative Kahn test in the second subject. Disseminated sclerosis is a cause of retrobulbar unilateral neuritis but it does not cause proptosis and is very uncommon on the West Coast. The subsequent history ruled out neuromyelitis optica and Schaller's disease. Venous congestion was ruled out by the absence of early fulness of the retinal veins. The association of lymphatic swelling and filariasis is well recognized but the author considered direct block of the retrobulbar lymphatics by microfilariae unlikely. He favours the theory that anaphylactic oedema due to the toxins of *O. volutus* was the explanation of the symptoms observed.

G. Lapa

CARRICK L. The Parathyroid Glands in Trichinosis *Amer J Clin Path* 1944 Jan v 14 No 1 24-7 [12 refs]

McGOWAN (*Biochem J* 1932 v 26 1138) has shown that injection of large doses of parathormone into laying hens produces a deposition of tri calcium phosphate in the walls of the blood vessels and thinks that the parathormone liberates calcium hydrogen phosphate from the bones by direct stimulation of the osteoclasts VON BRAND *et al* (*Amer J Hyg* 1938 v 27 461) claimed to have caused calcification of cysts of *Trichinella spiralis* in rats by injecting massive doses of parathormone which eventually caused death. The heaviest deposits were round the poles of the capsules. DE ROBERTIS (*Anat Rec* 1941 v 79 417) induced parathyroid hyperplasia experimentally by low calcium diets and there is circumstantial evidence that low serum calcium is a stimulus to the production of more parathormone.

The author used nine control guineapigs and nine others. To each of the latter he gave 500 *Trichinella* larvae through a catheter introduced into the stomach. The larvae were prepared by the method of QUEEN (*Amer J Clin Path* 1939 v 9 209) and only viable larvae were used. At about 19 day intervals the guineapigs were bled from the heart and the serum calcium was determined by the method of CLARK and COLLIP (*J Biol Chem* 1925 v 63 461). Serum phosphatase and inorganic phosphorus were determined by the method of BODANSKY (*Amer J Clin Path Tech Suppl* 1937 v 7 51). After an average time of 93 days the guineapigs were killed and sections were made of the parathyroids. The variations in the size of the parathyroids and the results of the chemical examination of the blood are shown in tables. As each animal was killed its skeletal muscles were digested by the method of QUEEN (*op cit*) and the number of *Trichinella* larvae was counted under a dissecting microscope.

In six of the nine infested animals there was slight loss of weight beginning about the 12th day. ROTH (*Amer J Hyg* 1939 v 29 D 89) found a similar loss of weight but most often beginning between the fourth and sixth week. In the nine controls the mean value of the serum calcium was 12.9 mgm per cent, the inorganic phosphorus was 4.97 mgm per cent, and the phosphatase activity 3.01 units. In the nine test animals there was no significant variation from the norm and the values were on the average the same as the controls. BEAHM and JORGENSEN [this *Bulletin* 1942 v 39 478] found significant increases of serum calcium in only 4 out of 13 dogs infested with *Trichinella*. In 44 human cases of trichiniasis PIERCE *et al* (*Amer J Hyg* 1939 v 29 D 70) found only a slight elevation of inorganic phosphorus during the second and third months after infestation and the blood calcium was near low normal levels early in the infestation but gradually increased during convalescence. Microscopically the parathyroids in the test animals showed hypertrophy and hyperplasia of the chief cells. Invasion of the skeletal muscle by young larvae and their encystment there occurred between the 33rd and the 44th days after infestation. Calcified larvae without cysts were found in the myocardium. DUNLAP and WELLER (*Proc Soc Exper Biol & Med* 1933 v 30 1261) found larvae in the myocardium of white mice as early as five days after feeding them with infested meat but do not mention calcified larvae. G Lajage

veins became veiled with exudate with a few flameshaped haemorrhages round the disk at 10 and 7 o'clock. The macula remained normal till the 13th day when it developed a complete star reflex. By the 33rd day the right fundus was returning to normal. The patient had been treated with atropine and heat to the right eye. On the 60th day the vision was 6/5R and 6/5L the haemorrhages had been absorbed and only slight fulness of the upper lid remained. On the 75th day a slit lamp became available and with it one microfilaria was seen in the right and left anterior chambers. There were no microfilariae in day and night blood films. From this time until the 90th day microfilariae were seen on most days in both eyes and on this day the patient was discharged with the right fundus normal. A course of NAB given to him was by then finished. Later it was possible to withdraw a microfilaria from the anterior chamber and this was found on staining to be *O. volutulus*. These microfilariae were also found in a skin snip, although no nodules could be felt. The right eye showed one fresh yellow speckled opacity in the cornea which the author has seen only in cases of orchocerciasis. Five and even months later the patient was well and had no trouble with vision or pain in the eyes although microfilariae were present in each anterior chamber. Except for the faintest veiling of the margins of the right disk the fundi were normal.

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G. Lapa e

CARRICK L. The Parathyroid Glands in Trichinosis. *Amer J Clin Path* 1944 Jan v 14 No 1 24-7 [12 refs]

McGOWAN (*Biochem J* 1932 v 26 1138) has shown that injection of large doses of parathormone into laying hens produces a deposition of tri calcium phosphate in the walls of the blood vessels and thinks that the parathormone liberates calcium hydrogen phosphate from the bones by direct stimulation of the osteoclasts. VON BRAND *et al* (*Amer J Hyg* 1938 v 27 461) claimed to have caused calcification of cysts of *Trichinella spiralis* in rats by injecting massive doses of parathormone which eventually caused death. The heaviest deposits were round the poles of the capsules. DE ROBERTIS (*Anat Rec* 1941 v 79 417) induced parathyroid hyperplasia experimentally by low calcium diets and there is circumstantial evidence that low serum calcium is a stimulus to the production of more parathormone.

The author used nine control guineapigs and nine others. To each of the latter he gave 500 *Trichinella* larvae through a catheter introduced into the stomach. The larvae were prepared by the method of QUEEN (*Amer J Clin Path* 1939 v 9 209) and only viable larvae were used. At about 19 day intervals the guineapigs were bled from the heart and the serum calcium was determined by the method of CLARK and COLLIP (*J Biol Chem* 1925 v 63 461). Serum phosphatase and inorganic phosphorus were determined by the method of BODANSKY (*Amer J Clin Path Tech Suppl* 1937 v 7 51). After an average time of 93 days the guineapigs were killed and sections were made of the parathyroids. The variations in the size of the parathyroids and the results of the chemical examination of the blood are shown in tables. As each animal was killed its skeletal muscles were digested by the method of QUEEN (*op cit*) and the number of *Trichinella* larvae was counted under a dissecting microscope.

In six of the nine infested animals there was slight loss of weight beginning about the 12th day. ROTH (*Amer J Hyg* 1939 v 29 D 89) found a similar loss of weight but most often beginning between the fourth and sixth week. In the nine controls the mean value of the serum calcium was 12.9 mgm per cent, the inorganic phosphorus was 4.97 mgm per cent, and the phosphatase activity 3.01 units. In the nine test animals there was no significant variation from the norm and the values were on the average the same as the controls. BEAHM and JORGENSEN [this *Bulletin* 1942 v 39 478] found significant increases of serum calcium in only 4 out of 13 dogs infested with *Trichinella*. In 44 human cases of trichiniasis PIERCE *et al* (*Amer J Hyg* 1939 v 29 D 75) found only a slight elevation of inorganic phosphorus during the second and third months after infestation and the blood calcium was near low normal levels early in the infestation but gradually increased during convalescence. Microscopically the parathyroids in the test animals showed hypertrophy and hyperplasia of the chief cells. Invasion of the skeletal muscle by young larvae and their encystment there occurred between the 33rd and the 44th days after infestation. Calcified larvae without cysts were found in the myocardium. DUNLAP and WELLER (*Proc Soc Exper Biol & Med* 1933 v 30 1261) found larvae in the myocardium of white mice as early as five days after feeding them with infested meat but do not mention calcified larvae. G. Lapage

SCHRIEBER W. Tierversuche zur Chemotherapie der Trichinose
[Animal Experiments on the Chemotherapy of Trichiniasis]
Ztsch f Immunitätsf u Exper Therap 1943 Dec 11 v 104
No 25 176-34

Referring to the outbreaks of trichiniasis in German troops in Poland and Norway and to cases among their relations to whom the soldiers sent uninspected pork [see *Bulletin of Na Medicine* 1942 v 3 236 and 1943 v 3 337] the author records that some German doctors who treated these patients found that fousadin reduced the temperature and improved the general condition while others especially those who treated patients on leave in Germany were sceptical about its good effects. Some of the literature on this treatment is cited. The author infested guineapigs and white rats with *Trichinella* and gave them injections of tartar emetic stibosan stibenyl antimosan and fousadin. In every instance the guineapigs and rats developed infestations of the muscles with larvae which were equal to those of the control not given these drugs. These antimonial compounds had therefore no effect on the parasites. Treatment of trichinosed guineapigs and rats with Bismutholaten phenocoll colloidal iron and copper and with dye the names of which are not given also failed to prevent larval infestation of the muscles. G Lapa e

FLEURY T Z & MURPHY F D. Cardiac Involvement in Trichinosis. Report of a Case in which there were Electrocardiographic Changes. *A Heart J* 1944 1 b 66-6 fig [19 ef]

DEFICIENCY DISEASES

NICHOLLS L. Nomenclature of Malnutrition. *Lancet* 1944 May 13 630

It is difficult to give comprehensive names to states of ill health due to malnutrition. Poor diets are always deficient in more than one respect and individual reactions to deficiencies vary. In a large prison in Ceylon all the prisoners received the same diet and the same amount of it. 50 per cent had phrynoderma 30 per cent night blindness 18 per cent sore mouth 16 per cent scrotal dermatitis. Many complained of neuritic symptoms and some showed signs of neuritis. Tentative diagnoses of neuritis polyomyelitis ataxia and beriberi were made. It was reasonable to conclude that all the prisoners were in a state of multiple vitamin deficiency.

In a children's hospital in Colombo 30 consecutive cases of malnutrition were studied. Various conditions of the skin mouth and eyes and general symptoms pointed to vitamin deficiency. It is thought that the shortage of rice and its replacement by white flour of 72 per cent extraction might have been connected with the malnutrition of the children.

The author suggests the use of the letters of vitamins—A B C D etc.—to indicate the causes of the symptoms and signs observed. AC DB₂ to indicate deficiency of A and C and D and B₂ respectively.

J F Corson

WILKINSON P B & AU KING Amblyopia due to a Vitamin Deficiency
Lancet 1944 Apr 22 528-31 3 figs

This article appears to be a reproduction of one which appeared three years ago (*Caduceus* 1941 v 20 13) though no reference is made to the latter

During the two years before Hong Kong fell into the hands of the Japanese diseases due to malnutrition became rife including pellagra. In the last half of 1940 15 patients complaining of dimness of vision were seen in which the amblyopia was apparently due to a vitamin deficiency. Such cases had not been previously observed. Examination revealed no abnormality in the media and no affection of the cornea or conjunctiva [no slit lamp examinations were possible]. There were no signs of vitamin A deficiency. In 11 the fundus was normal in four who had been ill 2 to 3 months optic atrophy beginning with pallor of the temporal halves of the disks was present and was accompanied by sluggish pupillary reaction to light and poorly maintained contraction. Photophobia was rare. These symptoms were accompanied by concentric or quadrantic constriction of the visual fields but it is noted in no case was it possible to demonstrate any central or paracentral scotoma.

The cerebrospinal fluid was normal. It is interesting however to note that between them these 15 cases contributed the following other signs: sore tongue, angular stomatitis, scrotal eczema, giddiness, numbness of the face and extremities, paraesthesia and weakness of the limbs but no objective sensory loss, no paralysis and no spasticity. One case exhibited a pellagrous rash. The diet consisted of polished rice and salt fish. All cases responded to yeast. A single case responded to a full hospital diet and then further improved after a week on 3 mgm of riboflavin per diem. A second case did not improve on similar treatment but did so when 100 mgm nicotinic acid were exhibited.

The cases obviously belong to that group collected together by the reviewer some years ago [this *Bulletin* 1936 v 33 88c] and again dealt with more recently (Lumleian Lectures 1944) *H S Stannus*

FERGUSON W J W Ocular Signs of Riboflavin Deficiency *Lancet*
 1944 Apr 1 431-3 2 figs

After referring to the original observations of SYDENSTRICKER *et al* [*Bulletin of Hygiene* 1940 v 15 621] upon certain ocular signs and symptoms which responded to riboflavin therapy and to the widely varying findings by many subsequent observers the author says: 'I feel misinterpretation has arisen largely through lack of experience in the use of the slit lamp through imperfect understanding of the normal variations of the appearance and vascularity of the limbus and through inclusion of corneal vascularisation due to other causes than riboflavin deficiency.' Defining the normal he goes on to state: 'The limbic plexus is the circle of capillaries which surrounds the corneo-scleral junction. The limbus corneae is a narrow band surrounding the true cornea combining elements of both cornea and sclera. [Explanations which will not perhaps help the uninitiated very much.]'

The author satisfied himself that there is a group of cases amounting to 7.8 per cent of 422 persons examined in Sheffield exhibiting corneal vascularization due to riboflavin deficiency. These cases may complain of mild photophobia, burning sensations and ocular fatigue.

and also slow lip tongue and skin lesions but none was seen with loss of visual acuity or signs of corneal inflammation

[This paper is one of the best that has appeared on the subject]

H S Stanis

- I LYLE T H MACRAE T F & GARDINER P A Corneal Vascularisation in Nutritional Deficiency *Lancet* 1944 Mar 25 393-5 1 fig
- II SCOTT J G Corneal Vascularity as a Sign of Ariboflavinosis *J Roy Army Med Corps* 1944 Mar 1 80 No 3 133-5 [11 refs]

I In their conclusions the authors state The degree of corneal vascularity was determined in about 4 000 R.A.F. personnel at 10 stations in this country and 12 stations overseas Many subjects receiving excellent dietaries had blood vessels on (sic) the cornea and subjects with much corneal vascularity did not always improve when the diet was supplemented Hence vascularity of the cornea is not necessarily evidence of deficiency in the diet

On the other hand it was regularly found that there was little corneal vascularity where the food was good and more where food was less satisfactory

It is not possible to summarize the results further as they embrace a large number of figures The article will be read with interest by all those engaged in similar work but there is much that is open to criticism

[(1) It is not stated whether or no observations were made with a slit lamp (2) The value of the ocular signs described apart from other evidence as diagnostic of riboflavin deficiency is doubtful (3) The method of notation adopted by quadrants is one likely to lead to fallacies (4) No reason is given for omitting an examination of the upper quadrant which is as important as the other three (5) The manner of scoring is unsatisfactory to give an example Type C in three quadrants yields the same total score of 12 as Type D say in the two lateral segments but the picture in the two cases is very different Progressive scoring should denote progression of the process under consideration (6) Type B is labelled as increase in vascularity of the limbus but this is a misnomer The word vascularity refers to a state the number of vessels present whether they be full or empty visible or invisible The vascularity of the limbic plexus does not change Type B is really within the limits of normal (7) No distinction is apparently made between vascularity and vascularization which should be done the latter is a process of change and the term is correctly used when applied to the clear cornea (8) It is not clear what is meant by vessel on the cornea they are in the cornea (9) The results of riboflavin therapy appear to be inconclusive as the result perhaps of inaccurate diagnosis For example to explain the great difference in the figures given in percentages for 2 groups of men to each of whom 10 m m riboflavin was given daily?

group in	experiment 2	23 improved	60 unchanged	1 worse
group in	experiment 3	5	9	3

Vascularization of the cornea has been hailed as a sign from heaven the truth is that without long study and very considerable experience of the whole problem it can prove a snare and a delusion]

II This second article refers to a rather similar survey carried out in the Gambia Ocular manifestations were sought for by means of

focal illumination and a binocular loupe among 400 Europeans and 300 natives. Thirty five per cent of the former and 5 per cent of the latter are stated to have shown corneal vascularization. Of 100 Europeans who had resided only two months in the country none showed the lesions of tongue or lips commonly ascribed to riboflavin deficiency but in 24 corneal vascularization was found. Of 300 who had resided over 12 months 24 showed cheilosis or glossitis and in 38 corneal vascularization was found. Of 300 who had resided over 12 months 24 showed cheilosis or glossitis and 38 corneal vascularization.

In another group 136 Europeans were examined by slit lamp. 26 exhibited no circum corneal injection. 47 a few circum corneal vessels. 3 many circum corneal vessels. 54 invasion of clear cornea by vessels forming one arcade. 6 with more than 1 arcade. To 70 Europeans 6 mgm. riboflavin were given daily for 12 days—13 per cent improved. 81 unchanged. 6 worse. Fifty received none—12 per cent improved. 82 unchanged. 6 worse. Six Africans treated with riboflavin lost their mouth lesions in 7 days but there was no change in the cornea.

[These results cannot be looked upon as conclusive. Examination in much greater detail would be necessary, likewise bigger doses over longer periods would have to be tried. All the figures obtained by loupe examination especially in the case of the dark eyed natives must remain doubtful.]

H S Stammus

HAEMATOLOGY

GIBLIN W E Some Clinical Notes on Macrocytic Anaemia in New Guinea Natives *Med J Australia* 1944 Jan 29 v 1 No 5 89-90

Clinical observations over the last 20 years show macrocytic anemia among the natives of New Guinea to be characterized by (i) relatively acute onset with pyrexia which may last weeks or months (ii) rapid enlargement of the spleen which is both painful and tender and diminishes in size during spontaneous remissions (iii) the blood picture as seen in stained films of a macrocytic anaemia (iv) rapid loss of weight (v) spontaneous remissions and relapses.

There is also a more chronic type in which the spleen is enlarged but not painful. The anaemia is of low grade and is compatible with reasonably good health but at times becomes more active as for example in the latter months of pregnancy. It runs a non febrile course and is amenable to liver therapy.

Most of the cases occurred among young adult males and the majority of the patients resided in the south eastern division of Papua with Samarai as a centre. Malaria is hyperendemic but the natives develop full immunity so that an adult is more or less free from attacks of malaria.

F Murgatroyd

SIPPE G R Autolysed Yeast in the Treatment of Nutritional Macrocytic Anaemia *Brit Med J* 1944 May 13 656-8

It is agreed that nutritional macrocytic anaemia as found in India, China, Africa and Macedonia is a deficiency disease. It is found in both sexes and is most prevalent in the second and third decades. It

is especially apt to appear during the latter half of pregnancy and in the presence of malarial plenomegalia it is probable that the disease is aggravated by excessive destruction of normal and abnormal erythrocytes by the hypertrophied reticulo-endothelial system [See FAIRLEY *et al* this Bulletin 1939 v 36 42.]

The exact part played by dietetic deficiencies in this disease is obscure. Autolysed yeast (Marmite) and crude liver extract both produce a maximal reticulocyte response but the results with anahaemin have been variable [WILLS & EVANS this Bulletin 1938 v 35 846 NAPIER *et al* *ibid* 846]. The active factor or factors appear to be water soluble heat stable in an acid medium and partially resistant to autoclaving in an alkaline medium. The potent substances can be obtained by extraction of beef flesh with 70 or 80 per cent alcohol but the potency is lost in concentrations of 90 per cent alcohol [FORMIJNE this Bulletin 1941 v 38 668]. Fractionating Campolon into soluble and insoluble portions with ammonium sulphate it has been found that the insoluble portion (containing the major part of the anahaemin) was very potent in pernicious anaemia but was inactive in artificially induced anaemia in monkeys (which was considered to be the counterpart of the nutritional macrocytic anaemia of man) while the soluble portion was active in both conditions [WILLS CLUTTERBUCK & EVANS *Biochem J* 1937 v 31 1136] this Bulletin 1937 v 34 501.

It is possible there are two essential haematopoietic dietary factors one which reacts with the intrinsic factor to form the liver principle and the other found in crude liver extracts and not precipitated with saturated ammonium sulphate which is necessary for the activity of pure liver extracts (WILLS *et al* *loc cit*). The commonest source of these factors in the average diet is beef flesh autolysed yeast (Marmite) is extremely potent but watery yeast extract and dried yeast powder are inactive (WILLS *Indian J Med Res* 1934 v 21 669).

A number of cases of nutritional macrocytic anaemia were treated in Mauritius with yeast obtained locally as a waste product in the manufacture of alcohol by fermentation of molasses. The yeast mixture is obtained from the bottom of the vat after fermentation has ceased and the top fluid has been run off. Normally this sediment is discharged on the fields where on account of its nitrogen content it has some value as a fertilizer. The sediment (yeast mixture) has the consistency of thin gruel and is brownish in colour the taste is not pleasant but water and sugar render it more palatable. Occasionally it produces omittin and diarrhoea probably owing to the taste and acidity of the mixture which has to be taken in comparatively large amounts and to the insoluble material present in the residue it may be possible to improve it in these respects by preliminary washing and evaporation. Before use the mixture should be passed through cheese cloth or a fine screen and afterwards sterilized at 70 C for 1 hour which not only kills pathogenic organisms but also the yeast cells themselves and so hastens autolysis.

To produce a satisfactory blood response three to six ounces of the mixture were required daily although in pregnancy especially during the latter half the bone marrow sometimes failed to react even with very large doses.

Analysis of mixtures from two separate distilleries showed one mixture to contain a large amount of inert calcium sulphate resulting from the bleaching process used to produce white (bleached) sugar.

This salt may possibly because of its bulk give rise to the diarrhoea and it is proposed therefore in future to use mixtures from distilleries producing raw (unbleached) sugar mixtures from such distilleries beside being free from calcium sulphate have a higher yeast content

Autolysed yeast sediments contain in addition to the haemato-poietic principles members of the vitamin B complex valuable in the treatment of pellagrous dermatitis angular stomatitis and glossitis They are also acceptable to religious sects who will not eat beef flesh Finally obtained as a waste product they are cheap and can readily be made available to all sections of the community

F Murgatroyd

VENOMS AND ANTIVENENES

SERGEANT E Sérothérapie antiscorpionique (Sixième note) Observations médicales reçues pendant l'année 1942 [Treatment by Scorpion Antivenene] *Arch Inst Pas cur d Algérie* 1943 Sept v 21 No 3 186-202

The author has brought his record of the value of this treatment up to the year 1942 previous records were abstracted in this *Bulletin* 1943 v 40 485 where references to earlier work are given During 1942 the number of cases treated was 177 The scorpions were identified in 24 cases as follows —*Prionurus australis* 18 *P anoreuxi* 1 *P hoggarensis* 1 *P liouvillei* 1 *Hottentota gentili* 1 *Buthus occitanus* 2 In 66 cases the clinical condition was noted as grave but 56 of these patients were cured and the symptoms were rapidly relieved usually within 24 hours Details are given of the 66 patients and of 9 who were not treated with serum and who died

Since this treatment was instituted in 1936 284 persons with grave symptoms have received antivenene and 85.2 per cent of them recovered In 94 of those who recovered death appeared to be imminent at the time of injection In 24 death occurred in spite of the serum but in 12 of these administration was too late in 10 in insufficient dosage in 2 both too late and too little In a letter from Dr VIARD it is suggested that the routine dose for every person stung by a scorpion should be 10 cc of the serum

Charles Wilcocks

DERMATOLOGY AND FUNGOUS DISEASES

MOORE M & JORSTAD L H Histoplasmosis and its Importance to Otorhinolaryngologists A Review with Report of a New Case *Ann Otolol Rhinology & Laryngology* 1943 Dec v 52 No 4 779-815 12 figs [61 refs]

The authors describe a case of histoplasmosis affecting the mucosa of the palate and lower jaw of a man aged 67 Two months after the granulomatous and ulcerating lesions had been noticed repeated but unsuccessful attempts were made with the use of the cautery to extirpate the disease and the patient died five months later The diagnosis was based on histological examination of material obtained by

biopsy from the lesions in the mouth. In its terminal stages the disease was characterized by secondary anaemia, fever, debility and irrational behaviour and generalization of the infection was suggested by enlargement of the liver and spleen and diffuse shadows shown in X-ray films of the lungs. Autopsy was not permitted.

The greater part of the paper is devoted to a survey of the literature of ha. plasmosis with a table compiled from the records of 22 cases of special interest to otolaryngologists. A bibliography of 61 references is appended.

J. T. Duncan

MISCELLANEOUS

J. AMER. MED. ASS. 1943 Dec. 18, 123 No. 16, 1037-3 Tropical Diseases in Returning Military Personnel

This statement was published at the request of the Sub-committee on Tropical Diseases of the National Research Council of the United States. It refers to certain tropical diseases which may be found in members of the forces who have served overseas and draws the attention of American medical men to the fact that unless these diseases are borne in mind mistaken diagnosis may be made which may endanger the lives of the patients and to the possibility that returning patients may initiate spread of some of the diseases among the people of the United States. (Both these points of view should be remembered in Britain.)

Malaria should be suspected in every person returning from the tropics or sub-tropics. It may simulate abdominal or respiratory diseases, meningitis, coma from other causes or anaemia. Diagnosis should be sought by repeated blood examination and treatment when diagnosis is made should be vigorous. It is important that the species of parasite should be determined. Mosquitoes capable of spreading malaria exist abundantly in certain States (and are found in certain parts of England).

Bacillary dysentery should be suspected in cases of chronic diarrhoea and bacteriological examination should be made. Transient or chronic carriers of the organisms are often found in contacts. Amoebiasis may be present even if the patient gives no history of an acute attack of dysentery and liver abscess may form long after return from the tropics. Amoebiasis should be suspected in any person from the tropics who has blood in the stool alternating diarrhoea and constipation or vague abdominal symptoms. Diagnosis demands expert skill and experience.

Filariasis has been contracted by American soldiers in the South West Pacific. Some of these men may have been discharged from the service during the long incubation period and come under civilian medical care during the first attack of lymphangitis the cause of which may not be appreciated unless blood examination is made. There is no specific treatment though sulphonamides are useful in lymphangitis. Mosquitoes capable of transmitting filariasis are present in parts of the United States but it is improbable that the disease will spread.

Other diseases mentioned are leishmaniasis, schistosomiasis, infections with *Loa loa* and *Onchocerca*, African trypanosomiasis, leprosy.

relapsing fever and various skin diseases caused by fungi. Though it is not likely that any of these will spread they should be remembered in the problem of diagnosis.

The authors of the statement advise physicians and health departments to prepare themselves for diagnosis treatment and control of these diseases [the advice applies to Britain no less than to the United States]

Charles H. Hocks

JOUBERT J. D. Midwifery in the Transkei with particular reference to Vesico Vaginal Fistulae. *South African Med J* 1944 Jan 22
v 18 No 2 19-20

From his experience of medical work in the Transkei region of South Africa the author concludes that the general belief that the native woman has her babies easily is a myth and that similar abnormalities to those met with in European women occur but with the added disadvantages of poor diet often chronic ill health and lack of medical assistance until the patient's condition is critical. There is one blessing however severe toxæmias of pregnancy particularly eclampsia are extremely rare.

The results of neglected labours are exhaustion shock ruptured uterus toxæmia or septicaemia and very frequently sloughing of the vaginal wall giving rise to vesico vaginal or recto-vaginal fistulae.

The rest of the article is concerned with the types of operation which the author has found most successful for repairing vesico vaginal fistulae.

Implantation of the ureters into the bowel was the operation most usually adopted. Spinal anaesthesia was preferred to general.

Emphasis however is laid on the need for preventing the development of such fistulae more doctors more trained midwives and more ambulances being advocated.

M. G. Blacklock

PARSONS SMITH B. G. Tropical Eosinophilia. *Lancet* 1944 Apr 1
433-4

A typical example of tropical eosinophilic lung is recorded this time in a European in Egypt. The symptoms began to develop after the patient had been living near Cairo for about eight months. As usual the diagnosis of asthma was made and the usual antispasmodics prescribed without benefit. The leucocytosis was at no time very great the highest noted was 20 000 per cmm and the proportion of eosinophiles did not exceed 34 per cent. Treatment by arsenic (neoarsphenamine) brought about as usual at first an increase in leucocyte total and eosinophile proportion soon followed by reduction and restoration to health.

This disease at first thought to be peculiar to India and especially the Bombay district of the west coast has now been reported from the United States of America and from Egypt. [The author states categorically it is not considered to be an allergic state but does not give his authorities or reasons. Though the cause is not yet known many believe it to be allergic. See also this *Bulletin* 1944 v 41 517]

H. Harold Scott

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H Harold Scott

the frames) were counted. The perimeter length per sq metre (intersection value) is low either when there are few leaves or almost complete coverage by overlapping leaves so that maximum number of larvae would be expected at intermediate values. This was found to be the case and there was throughout a strong positive correlation between intersection values and number of larvae recovered. It remains to be seen whether the relationship between intersection value and the number of larvae holds for other types of vegetation. It is suggested that the intersection line might provide shelter and food (epiphytic algae) as well as facilities for oviposition. The importance of this observation in connexion with larval control by altering the water level is obvious. Conditions of high intersection value for the particular type of vegetation will have to be avoided if the idea is found to be applicable to other types of vegetation and species of larvae.

W. A. L. David

LUMSDEN W. H. R. *Aopheles hapaola* Theobald 1903 (Dipt. Culicid.) from the Emirate of Transjordan. *Bull. Entom. Res.* 1944 Apr. v. 35 Pt. 1: 3-9 [10 cf.]

SICART M. Contribution à l'étude des anophèles de Tunisie. Présence d'*Anopheles (4) riera* (Senevet et Prunet 1927) [*A. martensii* in Tunisia]. *Arch. Inst. Past. d'Alg.* 1944 Jan. v. 31 No. 1-2: 13-4 [1 fi.]

PARROT I. Notes sur les phlébotomes. XL. Sur *Phlebotomus (Prophlebotomus) minutus* Rondani et sa variété *parroti* Adler et Theodor [*Phlebotomus minutus* and its Variety *parroti*]. *Arch. Inst. Pasteur d'Alg.* 1943 Jul. No. 1: 38-50, 6 figs. [36 ref.] [Summary taken from *Rev. Applied Entom.* Ser. B 1944 Apr. v. 32 Pt. 4: 66.]

Both sexes of *Phlebotomus minutus* Rond. and *P. minutus* var. *parroti* Adl. & Thdr. are described. The typical form of which *P. parroti* var. *siculus* Bonh. is considered a synonym apparently occurs throughout the European part of the Mediterranean basin from Spain to Crete and the author has a specimen from the Crimea. It is replaced in North Africa by var. *parroti* which occurs throughout Algeria, Tunisia and Morocco from the Mediterranean coast to the northern Sahara in both inhabited and uninhabited places. Very brief notes are given from the literature on the feeding habits of both, the probability that they are vectors of parasites of the gecko *Tarentola mauritanica* and the rearing of var. *parroti*. Neither is thought to bite man.

FELDMAN MURRAY B. Studies on the Ecology of the Levant House Fly (*Musca domestica* L.) (Macq). *Bull. Entom. Res.* 1944 Apr. v. 35 Pt. 1: 53-67, 5 figs. [15 cf.]

WIGGLESWORTH V. B. Action of Inert Dusts on Insects. [Correspondence]. *Nature* 1944 Apr. 22: 493-4, 2 figs.

It has previously been proved that chemically inert dusts kill insects by increasing the rate of water loss through the cuticle. Evidence is produced to show that simple abrasion of the film of wax lying outside the epicuticle is one of the most important factors in bringing about

this result Merely dusting a suspended insect does not produce an increased rate of water loss because abrasion cannot take place the increase is however very marked when an insect runs over a lightly dusted substratum In the latter case the abrasion which is not directly visible may be demonstrated by treating the exposed region with ammoniacal silver hydroxide which is reduced only in the abraded region by the polyphenols of the exposed layer of cuticle The impermeability is restored if the living insect is kept in a moist atmosphere for some days It can be shown that abrasion with dusts greatly reduces the time which insecticides such as nicotine and rotenone take to penetrate into the insect This may explain the observation that in practice certain dusts favour the action of insecticides

W A L David

MAYFIELD M Frances The Excystation Cultivation and Encystation of *Entamoeba coli* *Proc Soc Exper Biol & Med* 1944 Jan v 50 No 1 20-22

The author calling attention to the difficulties encountered by other observers [see DOBELL this *Bulletin* 1937 v 34 507] in obtaining and maintaining cultures of *Entamoeba coli* reports successes he has had by inoculating a medium consisting of egg slants covered by Locke's serum solution to which starch was added Cysts were obtained from 24 pure infections by a zinc sulphate centrifugal floatation method Large doses of saline washed cysts were inoculated to the medium In 15 instances excystation occurred and the amoebae growing abundantly were maintained in culture for varying periods between 4 and 19 months Two attempts to obtain cultures from trophozoites only failed Cyst formation occurred spontaneously in cultures on four occasions but the circumstances favouring this could not be reproduced at will The cultures were incubated at 37 C the medium having an initial pH of 7.8-8.0 and a final pH of 6.8-7.0

C M Wenyon

WENRICH D H Comparative Morphology of the Trichomonad Flagellates of Man *Amer J Trop Med* 1944 Jan v 24 No 1 39-51 3 text figs & 19 figs on 2 pls [38 refs]

Of the three trichomonad flagellates of man *Trichomonas hominis* is a species apart for *T vaginalis* and *T tenax* (the name adopted for the oral form) are closely related though sufficiently distinct to be regarded as separate species The last two have as a rule a single compound blepharoplast from which four anteriorly directed flagella arise *T hominis* on the other hand has two blepharoplasts a ventral small one from which a single flagellum arises and a dorsal larger one from which usually four but sometimes three or even two flagella originate The undulating membrane of *T vaginalis* and *T tenax* is considerably shorter than the body and there is no free flagellum while that of *T hominis* is the length of the body with a long free flagellum beyond it The costa and axostyle in *T hominis* are coarser than in the other forms which also resemble one another in the possession of a well formed parabasal apparatus which is absent in *T hominis* Though *T vaginalis* and *T tenax* resemble one another so closely the former is larger and has a relatively shorter membrane A fourth trichomonad *T faecalis* has been observed only once in a tapwater

charts he must consult and all the numerous and complicated forms which he must fill in. It tells him exactly what he must do not only when faced by his mosquito-enemy but also when confronted by the truculent householder or by the cowardly delinquent who leaves his house empty but locked. Having dealt with the main army in the urban area it goes on to describe the organization and maintenance of the guerilla warfare constantly being waged in the interior of Brazil by those members of the Yellow Fever Service who have been sent to fight against jungle yellow fever while the important part played by the auxiliary Maritime and River Services is also described. This close analogy between the health army and the combatant army of a country is well illustrated by the comparative ease with which money is raised and support gained during times of peril as compared with the neglectful financial dole and indifferent or even obstructive policy of the public in times of security. In the authors' own words: "At the time of a yellow fever epidemic or under threat of importation of the infection from near by epidemic areas adequate funds are easily obtained to prevent a public calamity and the health officer is judged not by the amount of money spent but by the immediate results of the campaign. Once the threat of yellow fever passes however government authorities and the health officer begin to consider the question of expense which is indeed heavy in comparison with other important health measures."

The last part of the book deals with such questions as the methods of marking maps and charts and of calculating the statistical information required. There is also an important section describing how legal enforcement can be put into operation with copies of the various legal documents, *n. l. c.* The volume ends with an appendix quoting the government regulations for the prevention of yellow fever in Brazil.

This book of 137 pages is well printed and well illustrated and is altogether on a generous scale. The pages measure 11 in. by 8 in. with wide margins and large print. Photographs and plans occupy much of the space and are of the same lavishly type, on a whole page being devoted to a diagram showing how to place the yellow fever service flag in a building where an inspector is at work. While another four pages show by means of diagrams the exact shape, size and colour of the flags of the various Services. The price of the volume is not mentioned.

The authors in the introduction rightly state that "Work worth doing is worth recording." This volume by Dr Soper and his colleagues is an account of work finely done and well recorded.

R. M. Gordon

MEDICAL RESEARCH COUNCIL. Spec. Rep. Ser. No. 248. A Provisional Classification of Diseases and Injuries for Use in Compiling Morbidity Statistics by the Committee on Hospital Morbidity Statistics — 168 pp. 1944. London: H.M. Stationery Office. [3s.]

Index to the Manual of the International List of Causes of Death (5th Revision 1938) for Use with the Medical Research Council's Provisional Classification of Diseases and Injuries 1943 (Special Report Series No. 248) — 92 pp. 1944. London: H.M. Stationery Office. [2s.]

Statistics of causes of death have become firmly based upon the International List but although the need for a parallel classification

for statistics of morbidity has been continually in the minds of those responsible for revising the death classification the question was still under discussion before the war. In Canada a classification was compiled and has been employed in some useful morbidity studies and in the United States of America a diagnosis code has for some time been in process of evolution. In Britain morbidity statistics have suffered from lack of comparability both as regards the contents of groups of similar title and the rules of selection where several morbid conditions are present. The Nuffield Provincial Hospitals Trust and those responsible for the *Medical History of the War* realized independently about 1941 that a standard classification had become an urgent necessity and the sequel was the appointment of a Committee of the Medical Research Council to prepare one. Their labours have resulted in the publication of this *Provisional Classification of Diseases and Injuries*.

During the preparation of the classification its practical application was thoroughly tested in the coding of more than 50 000 in patient records from all types of L M S Hospitals and such modifications were made as were found necessary. It can be said therefore that notwithstanding their complexity at first sight the list and coding rules have been proved to be workable by Coders without special medical training. Already the code has been in use for L M S in patient records for more than a year it has been adopted in condensed form by the Ministry of Pensions the Nuffield Bureau of Sickness Records and the Industrial Health Research Board and is being used in health surveys by the Ministry of Health and Wartime Social Survey and for hospital records by the Middlesex County Council.

The main framework is the same as that of the International List of Causes of Death but the arrangement of diseases within the sections is designed to meet the needs of morbidity classification and a much larger number of subgroups therefore appear. In a few instances diseases have been transferred to different sections as a result of new knowledge since the 1938 revision of the list. The assignment of the various diseases and synonyms in the Manual of the International List to the appropriate morbidity group is clearly shown and it is thus possible for the Coder to find the required code number for any of the 10 000 terms in the index of that Manual. To facilitate this H M Stationery Office have issued separately an Index to the Manual of the International List of Causes of Death (see above) and where coding of records is to be carried out for statistical purposes a copy of this should be obtained. There are sections in the code for ill defined conditions and symptoms in order to provide for cases where no definite diagnosis was made. Injuries are coded on a four fold basis by type of injury anatomical location external cause and mode of infliction (*i.e.* war accident self infliction or injury by another person). The code is designed both for writing on records and for machine card punching.

For most purposes statistics of morbidity will be based upon the final diagnosis of the condition for which the patient was first admitted to treatment and rules by which coders can determine this are laid down. The importance of standardizing this selection has recently been stressed in the Hospital Discharge Study of the Welfare Council of New York as a result of the difficulties experienced in that survey. For other purposes such as hospital indexing research and studies of complications and associations between diseases it may be necessary to code other morbid conditions in the patient and this is provided for by the suggestion that the principal complication or secondary disease

and the principal acute and principal chronic morbid conditions (independent of the primary) should be coded where such are present.

This Classification provides a basis for standardized statistics of morbidity not only for hospital but for many branches of social medicine and everyone interested in these matters should become acquainted with it.

Percy Stocks

GARRY T. Gerald [M.B.E. M.D. etc.] *The Prevention and Treatment of Disease in Warm Climates*. 94 pp. 1944. London Messrs Hutchinson & Co. (Publishers) Ltd. 4, Princes Gate S.W. 7.

The book is intended for the use of people living in the tropics in places where medical assistance is unobtainable—the author also thinks that doctors may get some useful hints from it. The first half deals with health in the tropics and includes advice on diet, exercise, clothing, insect pests and personal hygiene. In the second half the more important tropical diseases and some of the minor ailments are considered. There are two appendices—one is on sulphonamide compound while the other consists of 10 cookery recipes.

It cannot be said that the first part adds anything of importance to the information already available in several good medical guides for laymen in the tropics—there are some errors e.g. on page 22 it is stated that the average weekly allowance of food should contain 3,000 or 3,400 calories and 37 or 40 gm. of protein—the authorities quoted being the British Medical Association and the Ministry of Health.

In the second part there are many errors—prescriptions are written in a peculiar way—for bacillary dysentery—Sod. sulph. 2 oz (two small teaspoonfuls) acid sulph. dil. $\frac{1}{2}$ in tin cardamum $\frac{1}{2}$ aqu. Cls of ad 1 oz for malaria—Quin sulphate gr. $\frac{1}{2}$ acid sulph. aromatic $\frac{1}{10}$ syrupilem one ounce aqua chlorof. ad. oz $\frac{1}{2}$ and so on. Scientific names are often wrongly spelt: *Bacillus Pestis* (twice) *acides aegyptiacus* *Fasciatis* *Impetigo contagiosa* etc.

A doctor in the tropics would not find this book a useful addition to his library and it is hard to understand how the second part could give much help to laymen untrained in microscopical diagnostic methods.

J. F. Corson

TROPICAL DISEASES BULLETIN

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MEDICAL ORGANIZATION AND DISEASES OF THE ANDAMAN AND NICOBAR ISLANDS

BEFORE THE JAPANESE INVASION

By Charles WILCOCKS M.D. M.R.C.P. D.T.M. & H.

Acting Director Bureau of Hygiene and Tropical Diseases

HEALTH SERVICES

The medical staff of the Andamans consists of one senior medical officer a medical officer for the North Andamans a lady assistant surgeon several sub assistant surgeons (one born locally) one European nurse and subordinate staff There are 10 hospitals as follows —

<i>Hospital</i>	<i>Beds</i>
Ross European General	20 with X ray and laboratory
Ross Indian General	30
Ross Convict	50
Haddo	300 with laboratory
Bamboo Flat	25 takes tuberculosis leprosy and infectious diseases
Dundas Point	25-40
Tusonabad	25
North Andaman	25 Bonington Hospital chiefly for Forestry Department
Cellular Jail	50
Atalanta Point	— for women and children

Bacteriological examination of water and other material can be carried out at the Haddo laboratory

In addition to these hospitals there are dispensaries at Garacherama Homfrayganj Mavmyo Ferrarganj Port Mouat Lowisabad (temporary for labourers on dredging work) Ihoenix Bay (marine workshop) and at the forest camps on Long Island (Middle Andaman) and Manglutan (travelling) Most of the fixed dispensaries have 5 to 10 beds each The dispensaries are in the charge of convict or ex convict compounders trained at Port Blair These men often return to this work when set free after serving their period of detention

A motor ambulance is available to the medical department

In the Nicobars there is a mission hospital at Mus Car Nicobar which is State aided and at which about 9 000 cases are treated each year and a Government hospital under the care of a sub assistant surgeon at Nankauri.

The general sanitary conditions of the people of these islands are poor. The inhabitants have no understanding of the importance of proper disposal of excreta and refuse but the convict settlement is in a better state and in recent years some latrines have been installed in the villages. These are as yet few but their use will extend. At Ross and Aberdeen no refuse is dumped into the sea the drainage at these places has recently been improved. Head lice and body lice are to be found on the people.

Water supply is drawn largely from shallow wells or streams but rainwater tanks are not uncommon. There are protected reservoirs at Hope Town, Bamboo Flat and Lamba Lines village. Water is taken to Ross Island in water boat. At Bonington the supply is not good the tanks are liable to surface pollution and the water from a tube well was found to be unsatisfactory. Various samples of water have been sent from the Andamans to Rangoon for testing and only on one occasion was the sample passed for purity. All water should therefore be boiled or otherwise sterilized before use unless vouched for by the medical authorities.

INSECT BORNE DISEASES

Malaria—The malaria of the Andaman is peculiar in that it is transmitted so far as is known by only one species of mosquito *Anopheles sudanicus* (the *A. ludlowi* of several authors) which since it breeds in water which has a high content of salt (though not in actual sea water) has a restricted distribution in the neighbourhood of salt swamp. The water cut off from the sea by the artificial bunds constructed in the harbour area of Port Blair which is diluted with rain water forms an ideal breeding medium for this mosquito. The rainfall is most abundant in the period May to September and at this time therefore there is the greatest amount of diluted salt water mosquitoes are most prevalent and malaria most intense. At this time also the warm weather is most favourable to rapid breeding. The disease becomes epidemic in convicts employed in reclamation and bunding work during the monsoon.

Malaria is therefore common in the villages around the salt swamps in villages more than half mile from these swamps the disease is comparatively rare. The malarious villages of Port Blair are—Kadakachan, Bumitan, Dhanu Khari, Chauldani, Sipihat, Taylerabad, Nawabpahr, Stewartanj, Hornfrayganj, Mitha Khari, Bamboo Flat, Knappuram, Herbertabad, New Nawabpahr, Muslim Basti, Mallapuram, Manpur, Mannarhat, Hashmatabad, Calicut, Parthura and Forest Village. Viper Island is a most malarious spot. In the first seven of these malaria is particularly severe and the proportion of children having enlarged spleens at times reaches 100 per cent. This heavy incidence causes many deaths in infancy, predisposes the inhabitant to other diseases and adversely affects the birth rate by diminishing the number of conceptions and increasing the number of abortion.

Malaria is much less prevalent in villages situated away from the salt swamps and therefore out of effective range of *A. sudanicus* in spite

of the fact that round these villages there are rice fields and fresh water swamps in which a number of other species of *Anopheles* breed. The spleen rate in children averages about 5 per cent. in adults about 24 but this relatively high adult rate is probably due to the fact that many of the men have spent much of their lives elsewhere and have contracted malaria in other parts either out of the Andamans or in the convict stations.

Malaria is not confined to the Port Blair area. The Burmans of the villages of Long Island suffer severely as do the natives in Passage Island. In both of these islands there are salt swamps. *Anopheles sundaus* is also found in North Andaman and Middle Andaman in Henry Lawrence Island and Sound Island. In all these there is malaria especially in employees of the Forestry Department. In Karen villages malaria was severe in a group of relatively non immune Burmans who arrived there shortly before 1927. Ross Island is reputed to be free from the disease.

In natives long exposed to malaria infection a considerable immunity is developed by the time adult life is reached and it is noted that the self supporters living in Chauldani a quarter of a mile from a very malarious convict camp were themselves largely immune.

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The type of malaria commonly found varies with the season of the year. In one report subtertian accounted for 59 per cent. of the cases benign tertian for 11 per cent. quartan for 30 per cent. but it is noted that subtertian is higher in children than in adults and that it increases when transmission is active and anophelines are prevalent i.e. from May to September. Other reports give higher figures for benign tertian (especially in children) and much lower for quartan. The reason for the relatively high incidence of quartan found by two independent observers is not clear. It is present in acute cases as

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These mosquitoes (other than *A. sundaus*) have not been found to carry malaria in the Andamans but some of them are known vectors elsewhere though of poor efficiency and it is not possible to say that they cannot play a part in transmission in the future.

No information concerning the *Anopheles* of the Nicobars is available but it is probable that *A. sundaus* is responsible for malaria there as it is else here in the islands off the Malay peninsula.

The type of malaria commonly found varies with the season of the year. In one report subtertian accounted for 59 per cent. of the cases benign tertian for 11 per cent. quartan for 30 per cent. but it is noted that subtertian is higher in children than in adults and that it increases when transmission is active and anophelines are prevalent i.e. from May to September. Other reports give higher figures for benign tertian (especially in children) and much lower for quartan. The reason for the relatively high incidence of quartan found by two independent observers is not clear. It is present in acute cases as

well as in relapses though probably more common in convicts than in children. The vector is the same as that of the other species of parasite.

As a result of control measure taken in recent years which have included the removal of villages originally close to the dangerous salt marshes the amount of malaria has shown a definite decline but it is noted that in 1927 it was still the principal cause of illness and was responsible about that time for 7 to 15 per cent of deaths from all causes. In 1921 50 per cent of prisoners were treated for malaria in 1940 the figure had fallen to 16 per cent.

The antimalarial measures are carried out by a special gang and consist chiefly of reclamation of swamps. Suppressive drugs are given to the prisoners in the transmission season and treatment of attacks is thoroughly carried out. It is worth noting that a fairly high incidence of malaria occurred in 1930-31 when harbour reclamation work was being undertaken in connexion with military operations. Harbour work may give rise to considerable outbreaks especially in Europeans who have little or no immunity.

From the Nicobar Islands there is little detailed information but it is known that malaria is prevalent. It is probably conveyed in the same way as in the Andamans and especially in the rainy season from May to September but there is no definite information available as to its distribution. It would however be wise to expect it in the neighbourhood of salt marshes.

Blackwater fever is occasionally seen in the Andamans.

Sandfly fever is known in the Andamans but kala azar and oriental sore—also transmitted by *Phlebotomus* in other countries—have not been reported.

(See also filariasis below.)

INTESTINAL DISEASE

It has been noted above that the water supplies of the Andamans are usually polluted and this is no doubt also true of the Nicobars. It is to be expected therefore that water borne disease should occur. Further in view of the lack of sanitary sense in the village natives and of the inadequate number and use of latrines it is to be expected that intestinal diseases caused by the fouling of food or water by human excreta should be prevalent.

Bacillary dysentery and *diarrhoea* are common especially during the rainy season and in newly arrived persons. These diseases are probably conveyed more by flies and by contamination of food through direct handling by infected persons than by contamination of water. They take a heavy toll of infant life. *Amoebiasis* is reported to be common but liver abscess is rare. Dysentery is also well known in the Nicobars.

Members of the *typhoid* group occur sporadically in the Andamans and small outbreaks have been reported for instance one near the Aberdeen bazaar in 1934-35.

It has been noted in several reports that *cholera* has not been found. Neither typhoid nor cholera is mentioned in the Nicobars.

Sprue is relatively common in convicts and self supporters in the Andamans and is believed to be increasing. In these cases there is often a history of amoebic dysentery but there is a suggestion that dietetic factors may play a part in causation.

HELMINTHIC INFECTIONS

Hookworm infection is common throughout the Far East and in the Andamans it is found in about 25 per cent of the police force and no

doubt in a greater proportion of the general population. In 1939 a survey was made which revealed more cases than had previously been known. It is said that fresh infections are constantly introduced into the police force by recruits from India and by men returning from leave.

Filariasis is common in India, Malaya and the Nicobars, yet it is not known in the Andamans. Embryos were found in the blood of one prisoner from India and this man was sent away from the Andamans so that he should not infect the local mosquitoes and so originate the disease in the islanders. In the Nicobars the position is very different, elephantiasis is common and one observer found 35 cases in a population of 600. The incidence of filariasis (that is of embryos in the blood not necessarily accompanied by elephantiasis) must be much greater. Information on the species of filaria responsible for the condition in the Nicobars has not been seen, but it is probably *Wuchereria bancrofti*, transmitted by *Culex fatigans* and other mosquitoes.

OTHER DISEASES

Leptospirosis (*Weil's disease*) — This disease which occurs sporadically in many parts of the world is unusually prevalent in the Andamans though there is no report of its occurrence in the Nicobars. It is caused by a leptospira which in other countries is a parasite of rats. In the Andamans though the rats examined have been negative it is probable that some such reservoir of the disease exists. The infection in man is widely scattered, cases occur in all seasons but are most common from June to December, that is during and after the rains. Most of the patients are adult males engaged in agricultural work in the rice fields or in bund construction, both of which occupations entail working in water for long periods. In 1938 there were 152 known cases with 25 deaths; in 1939 49 cases with 11 deaths. This reduction coincided with a lowered rainfall in the latter year. Cases have been found throughout the Port Blair settlement, inland as well as along the sea coast. The soil and water may be contaminated by man or rodents, since the urine of both contains the organisms during the course of the disease and intermittently for 44 days at least during convalescence in some cases.

In the Andamans the disease which has been recognized since 1892 is often mild but severe cases may occur and the case mortality is about 18.7 per cent. There is fever and the outstanding symptoms are severe muscular pains, prostration, haemorrhages from mucous membranes, jaundice (in two-thirds of the cases) and albuminuria. The milder cases with pain but without jaundice may be mistaken for dengue. *Leptospirosis* may occur together with malaria and in the malarious districts the finding of malaria parasites in the blood is not enough to exclude the diagnosis of leptospirosis if the symptoms suggest that disease and especially if the fever does not respond to anti-malarial treatment. Diagnosis is best made by means of blood culture in suitable media during the first six days of fever but agglutination tests are possible at a later stage.

For treatment a serum has been prepared against the local strains and has given signs of usefulness. In prevention a vaccine has been employed and is probably of some value. The question of disinfection of soil and water has been considered and the use of calcium cyanamide has been advised. It is evident however that the use of this on a large scale presents difficulties.

Yaws is common in the Nicobars but there is no record of it in the Andamans it is said that in the island of Teressa where the incidence is very high the fertility of the people is low but as yaws is not transmitted hereditarily this association may be due to other causes Syphilis is known in the Andamans and probably in the Nicobars Gonorrhoea occurs in both groups of islands

Of the infectious diseases there are records of small outbreaks of smallpox in the Andamans and Nicobars on each occasion due to the introduction of infected persons from India or from Burma These outbreaks were soon controlled Chickenpox measles and mumps occur sometimes in epidemic form There have been epidemics of influenza with high mortality for instance in the Nicobars in 1939-40 when pneumonia was common The latter disease is a common cause of death not necessarily in epidemic form in the Andamans Bronchitis is common and in the Andamans asthma is exceptionally prevalent the moist atmosphere has been blamed for this It is noted that tuberculosis occurs in the Andamans This usually affects the lungs and is a very fatal disease in these natives

Tropical ulcer is reported but not in great amount

In 1921 there was in the Andamans an outbreak of dropsy among the free Ranchi coolies in one camp With this dropical condition there were disturbances of the digestive system and spontaneous bleeding gums were common The cause of the outbreak was obscure there were points against diagnoses of scurvy beriberi and epidemic dropsy In 1936 a few cases of epidemic dropsy were recorded and were ascribed to the eating of old rice It is now known that this condition is connected with mustard oil or some contaminant of mustard oil but beriberi is associated with a rice diet and has been ascribed in Burma to the consumption of mildewed rice this being so it is possible that this outbreak may have been a form of beriberi Other food deficiency diseases are not recorded

The diet of the people is apparently fairly satisfactory the convicts are well fed having plentiful supplies of fish and vegetables Among the islanders rice and dal are staple articles of diet A dairy farm supplies milk In the Nicobars pigs are kept and cattle are fairly numerous Coconuts are cultivated and largely eaten Fish is common

There is considerable smuggling of opium into the Nicobars and addiction is reported

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SUMMARY OF RECENT ABSTRACTS *

VII HELMINTHIASIS

[Continued from p 636]

Hookworm Infection

Hookworm infection is widespread in the Szechwan Province of China and CHANG *et al* (p 851) have attempted to relate the incidence to the kinds of agriculture practised in the various areas. There appears to be no relation to mulberry cultivation or rice cultivation and the production of sugar cane and citrus trees does not seem to be important in this respect. In general dry land cultivation of miscellaneous crops in the hilly sections of the province probably produces conditions favourable for hookworm propagation and there is a specific association between sweet corn potato cultivation and hookworm disease which has not hitherto been recognized.

NICKEL (p 70) reports on a survey of amoebiasis and hookworm infection in the State of Mississippi. Of 49 170 specimens from all parts of the State 24.3 per cent were positive. Two previous surveys had been made in 1910 and 1932-33 and the results are compared. The techniques in the three surveys were different but not sufficiently so to invalidate some comparison. There was a considerable reduction in the number of infections between the first two surveys but since then there has been an increase though the severity of the infections has fallen.

HILL and ANDREWS (p 324) have studied the relationship between hookworm burden and physical status in white persons in Georgia, U.S.A. In general a decrease of haemoglobin accompanies an increase of hookworm infection but there are wide differences in individual reactions. In Mississippi particularly the haemoglobin decreases rapidly with light infections. These differences are probably due to anaemia caused by agents other than the hookworm probably constitutional or nutritional factors. It is noted that three quarters of the patients with signs of cardiac abnormality showed signs of nutritional complications and that diets in the rural areas are deficient in animal protein, iron and vitamins. The authors found that without iron therapy recovery is slow after removal of the worms; the drug they use is tetrachlorethylene and iron is given in the form of Blaud's pill.

HEILIG (p 68) has studied the effects of hookworm disease on the heart. He points out the importance and difficulty of distinguishing between decompensated mitral disease with failure of the right heart and the cardiac lesions induced by hookworm infestation because the fate of the patient may depend upon the treatment given. The deciding factors in this differentiation are set out. In his investigations he found that in the great majority of cases the cardiac condition improves in proportion as the blood count and haemoglobin percentage improve after administration of an anthelmintic and subsequent iron treatment.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* n 1943 v 40. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

but in some of his cases in which the drugs had failed to clear out all the worms the condition did not disappear although improvement in the blood count and haemoglobin was marked. After other doses of anthelmintic had been given however and the worms expelled the cardiac disabilities soon disappeared. Heilig argues that these experiences provide evidence in favour of the view that there is a toxic element in hookworm disease as it affects the heart—the nature of the toxin however is not known. In severe cases it is his practice to give a course of Bland's pill before administering the anthelmintic.

YENIKOMSHIAN and SHEHADI (p. 614) report on patients with clinical histories suggestive of duodenal ulcer and with ova of *Ancylostoma duodenale* in the faeces. Free acidity was estimated and showed a rise higher than that obtained in duodenal ulcer and the high levels were maintained in spite of varying degrees of severe anaemia. X-ray showed various abnormalities of the duodenum but these were rapidly eliminated and epigastric pain was relieved after an anthelmintic was given.

BOYNE (p. 325) describes five cases in which *Ancylostoma duodenale* was found in haemorrhagic areas of the intestinal wall of man having invaded the tissues. The patients were Malays and a Chinese in Java where infection with this worm is not common. Similar invasion in man had previously been found due to *A. braziliense* but *Aecator americanus*, the commonest hookworm of Java, does not apparently invade the tissues. The reason for this may be the absence of teeth from its buccal capsule.

MUKERJI and MAPLESTONE (p. 707) have tested numerous methods of preserving hookworm eggs in faeces. Most were unsatisfactory but it was found that by diluting the faeces 1 in 30 in 1 per cent NaCl solution the eggs could be preserved in good condition for about one month. They therefore suggest that 3 cc of faeces should be collected in a paper container and dropped into a bottle containing 87 cc of 1 per cent NaCl which is then corked and sent to the laboratory for counting. There is no loss of eggs in this procedure.

WILKINS (p. 67) describes a simple glycerin salt technique for counting hookworm eggs for the details of which the original abstract should be consulted. He claims that the method is accurate enough for clinical purposes. In treatment he uses the following mixture: 2 cc carbon tetrachloride, 1 cc oil of chenopodium, 15 gm magnesium sulphate, water to 30 cc. Of this 1 cc is given for each 4 lb body weight.

ANDREWS (p. 615) discusses the anthelmintics used in the treatment of hookworm infections and concludes that carbon tetrachloride and oil of chenopodium though very effective have toxic effects which render their use undesirable. He advocates tetrachlorethylene, two doses of which are theapeutically equivalent to and much safer than one dose of carbon tetrachloride. If *Ascaris* also is present he advocates hexyl resorcinol followed by tetrachlorethylene. In control the policy should be to detect and prevent hookworm disease (in which blood loss exceeds replacement) rather than to eradicate subclinical infections. The family should be the unit for investigation and attention should be paid to the nutritional side of the problem. It has been shown that in dogs immunity can be developed against the dog hookworm but that this can be broken down by dietary deficiencies.

HEILIG and VISWESWAR (p. 400) have investigated the influence of anti-anaemic treatment (viz. administration of 90 grains of Bland's

pill each day) on gastric function in hookworm disease. A relatively high proportion of the series of patients showed achlorhydria or hypochlorhydria but although the anti-anæmic treatment was successful in improving very greatly the condition of the blood it was found to have no effect on gastric secretion and exerted its effect independently of the gastric acidity. [Compare Yenikomshian and Shehadi above.]

ANDREWS and WEBB (p 158) have investigated in dogs the effect of moderate hookworm infection on the absorption of quinine from the intestinal tract since it has been thought that in human malaria the lack of response of some cases to quinine may be due to coincident hookworm infection. They found that moderate infestation has little or no effect on the maximum blood concentration of quinine or on the time elapsing between administration of the dose and the attainment of that maximum.

SHELDON and GROOVER (p 321) show that round the oral genital and anal openings of infective larvae of *Necator americanus* incubated in serum from infected children there form fine granular deposits similar to those which have been found in comparable experiments with *Ancylostoma caninum*. Not all sera from infected children produced this effect however and with the sera of heavily infected children no deposit was formed. The deposit was not given with sera from normal children. The precipitins which cause this effect do not *in vitro* hinder the activity of the larvae but it is possible that *in vivo* they may immobilize or otherwise interfere with the larvae or inhibit their enzymes. The inconstancy of their appearance indicates that the precipitins may not be specific.

Ascaris Infection

In the plain of Kasenyi near Lake Albert SCORS (p 250) notes that the commonest helminth infection is schistosomiasis. *Ascaris* infection is next but ankylostomiasis is very rare.

RAČIĆ (p 792) refers to the X ray appearances in heavy *Ascaris* infection and to the fact that the worms are often arranged in bundles parallel with each other. This condition is not so dangerous as when they are tangled together into a ball which may cause intestinal obstruction.

In view of the proposal to use sewage for manuring vegetable gardens on the outskirts of towns in Russia VASSILKOVA (p 318) has investigated the helminth egg content of sewage. He found 19 ova per litre several species being represented. Contamination of the vegetables was also found but the only viable ova recovered were those of *Ascaris*. He suggests that sewage may be used for this purpose if it is allowed to stand for two hours in special ponds when most of the ova will have sedimented out or if the vegetable beds are infiltrated through trenches. Vegetables to be consumed raw must not be laid on the ground after collection.

The same author (p 318) has found that in open pit latrines *Ascaris* eggs were all dead after having been left for six months. In pit latrines covered with boards and earth a period of 10 to 13 months was necessary before total destruction could be achieved but if the faeces were covered in early spring a period of eight months was enough since destruction is more rapid in summer. In faeces diluted with equal volume of water only 95.5 per cent of eggs were dead in

20 months diluted faeces therefore should not be used for manuring vegetables and berries consumed raw.

SCHILL (p 790) has investigated the *in vitro* action of certain anthelmintics on Ascarids from the pig. The known anthelmintics are active in water but in intestinal contents they are either inactive or active only after a long time. The action of santonin was transient and in most of the experiments therefore oil of chenopodium was used. Its action is delayed by intestinal contents but addition of alcohol and chloroform or paraldehyde increases its activity both in water and in intestinal contents. The mucus which surrounds the worms in the body may have an effect in protecting it against the drug and the capsules in which the drug is contained may not dissolve quickly enough. The author therefore suggests that a duodenal tube be passed the intestine be emptied and its mucus dissolved by washing out with a solution of sodium bicarbonate and that 100 cc of water containing 0.06 gm oil of chenopodium 0.5 gm paraldehyde 15 gm aqua chloroform and 5 cc absolute alcohol be passed through. This may be repeated in half an hour to attack worms not affected by the first dose. A quarter of an hour later a saline purge should be given [It is not stated if this method has actually been tried in man.]

Filariasis

HAWKING (p 616) has reviewed the literature of filarioid infections in East Africa.

Having found microfilariae in the blood of 40 per cent of a small group of soldiers from Uganda examined while on service in Palestine FINE and LYNN (p 96) suggest that infected recruits should not be sent out of the areas in which they were recruited lest they infect the local arthropod vectors. Most of the parasites were not identified.

GALLIARD (p 71) reports observations on the emergence of larvae of *Wuchereria bancrofti* from the proboscis of *Culex fatigans*.

RUTISHAUSER (p 72) describes an operation for elephantiasis of the scrotum of which details are given in the original abstract.

RAO (p 160) reports on a focus of filariasis in Lower Assam where the infection was principally due to *Wuchereria malayi*. The general nocturnal microfilarial rate was 4.7 per cent, but in one village was as high as 28.2 per cent. Clinical signs of the disease were found in 4.5 per cent. Comparison with earlier surveys indicates that there has been no increase in the infection rate but that there are more cases of clinical disease. Villages in swampy areas showed high incidence and several species of *Mansonioides* were found breeding in association with *Pistia stratiotes* and with Dol grass (*Sacciolepis interrupta*). Village in extensively cultivated districts were practically free. In only one village was *Culex fatigans* found and there the infection was with *W. bancrofti*.

HU (p 254) states that *Culex fuscus* is susceptible to infection with *W. malayi*, but probably does not play a significant rôle in transmission in the Yanetze region because it seldom enters houses or feeds on man.

VAN DEN BERGHE (p 167) has published the results of his extensive investigations on the problem of onchocerciasis in the Belgian Congo. He points out that transmission by *Simulium* has never been conclusively proved but agrees with BLACKLOCK that in so far as experiments with wild flies can be accepted as evidence in the absence of actual transmission to man and animals *Simulium damnosum* is a vector of

O. volvulus *S. damnosum* is found most frequently near rapid streams but after rain may be seen as far as 500 metres from a river. It bites more especially in the morning but also in the evening and tends to bite low close to the ground. The author has demonstrated for the first time the presence of adult female *O. volvulus* in full reproductive activity outside the nodules. He found in one group of people an excess of those with dermal microfilariae over those with nodules and thinks it probable that the presence of microfilariae in persons free from nodules can be attributed to these extra nodular adult female worms. Five categories of nodules are recognized: (1) Those with eggs liberated by damage of the contained female by the needle. (2) Those with few larvae and no eggs. (3) Those with greenish syrupy or caseous pus without eggs or larvae. (4) Cold abscess full of pus and sometimes cuticular remains of worms. (5) Fibrosed nodules without eggs larvae or pus. The author discusses some of the little known general manifestations of onchocerciasis. Eosinophilia varies from 15 to 35 per cent. Cutaneous manifestations are difficult to associate with the infection—they are never pathognomonic. The ocular manifestations are less controversial in patients with cranial nodules and with microfilariae in the conjunctiva. The connexion of affections of the lymphatic glands with onchocerciasis is not definitely established. These affections and elephantiasis are often due to causes other than onchocerciasis. In treatment surgical removal of nodules is better than the injection into them of substances designed to kill the worms. Prophylaxis is impossible—Simuliidae cannot be eradicated. There is an enormous reservoir of infection in man, buffalo and antelope. Clothes are man's only means of partial protection.

RODHAIN (p. 167) agrees with van den Berghe in holding that there is lack of experimental proof of the relation between *O. volvulus* and glandular enlargement but quotes a case in which microfilariae of the *Onchocerca* type were found in enlarged inguinal and para axillary glands and in which no other cause of enlargement could be found.

BARLOVATZ (p. 327) describes inflammatory reactions which may occur in or around the nodules of onchocerciasis. These may be due to transient congestion without other factors in which case pain and fever are eliminated by excision or there may be another concomitant cause of fever which will not be removed by excision. He cites cases in which inflammation of nodules preceded the development of typhus or typhoid.

SCHWETZ (p. 213) notes that filarial infection is frequent along the lower reaches of the Lomami River in the Belgian Congo. *Acanthocheilonema perstans* is much more common than *Loa loa*. *O. volvulus* is confined to members of one tribe in a district where *Simulium damnosum* is found.

YOUNG and GORDON (p. 73) report a case of onchocerciasis probably contracted in the Northern Territory Province of the Gold Coast where *Simulium damnosum* has recently been found.

DAMPR (p. 255) discusses onchocerciasis as an international problem connected with the construction of the Pan American Highway which passes through two foci of the disease. Spread will take place along that Highway unless precautions are taken but the author is optimistic and thinks that Mexico and Guatemala can be cleared of the infection. He suggests that in the dry weather streams may be freed from Simuliidae by treatment with creolin in the dry season.

when the number of streams is in insignificant whole areas could be sterilized at little cost

TORRES E TRADA (p 709) contributes an important note on the detection of microfilariae in the eyes of patients with onchocerciasis. He finds that they can best be seen by means of the electric direct image ophthalmoscope using a +20 to +40 diopter lens. The examination is simple and can be carried out anywhere. Microfilariae seem to be more abundant in the vitreous than in the anterior chamber and may therefore be seen by ophthalmoscopy when corneal microscopy would fail. They are negatively phototactic being more apparent in the anterior chamber by night than by day and more numerous at the periphery of the pupillary field than within it during examination.

SEMADENI (p 616) describes in detail the histological appearances in the eye of a patient in whom about 300 living microfilariae of *Onchocerca volvulus* had been seen by slit lamp microscopy in the anterior layers of the corneal parenchyma. The microfilariae were present in practically all tissues in which there are lymphatics. He notes the value of slit lamp microscopy in diagnosis.

FAZER (p 73) writing of the drug treatment of onchocerciasis states that of the drugs tried only euslavine, tryparsamide and Bayer 903 appeared to be effective and then only if combined with protein shock (T.A.B.) therapy. Unfortunately complete details of the courses of treatment are not given in the original article.

MEESER (p 475) has made a preliminary study of the Simuliidae of Southern Rhodesia where onchocerciasis is known to occur.

VARGAS (p 74) has studied the development of *Onchocerca volvulus* in Simuliidae. The details of his findings should be sought in the original abstract.

GOVNETT (p 160) having never lived in an endemic area of filariasis was given an injection of blood from a patient in whom microfilariae of *Loa loa* and *Acanthocheilonema perstans* were present in large numbers. The fate of these microfilariae was followed. Microfilariae of *L. loa* (and also of *H. bancrofti*) can live in the blood of a fresh non-immune subject for four to eight days. In GOVNETT the surviving microfilariae exhibited some diurnal periodicity and it seems therefore that this feature is rather an attribute of the embryos and the host than due to periodic parturition of the adult female worm. Microfilariae of *A. perstans* were found for three years though most were lost in the first few days.

In the Omanabad District RAO (p 256) found a general incidence of guinea worm infection amounting to 28.9 per 1,000, the heaviest being in persons aged 11 to 20. One attack apparently does not confer immunity, the author thinks rather that it renders the patient more susceptible. In some patients 15 to 20 worms were found. More than 80 per cent of the population have harboured the worm at one time or another. The author details the measures he would adopt to protect the water supplies.

DE MEILLON and GILLESPIE (p 554) describe a female nematode closely resembling *Filaria conjunctivae* which was removed from beneath the conjunctiva of a woman who had travelled extensively in Central Africa. Identification could not be made with certainty but if the worm is *F. conjunctivae* this is apparently the first record from South Africa. No microfilariae were found in day or night blood. Rossi (p 927) reports from Italy a case of infection with

Filaria conjunctivae in which an immature female worm was found in a small tumour of the breast

PETROV (p 326) reports a case of infection with *Loa extraocularis* in a woman from the Caucasus The infection was localized in the buttock

MAZZOTTI (p 476) has found a high incidence of infection with *Mansonella oardi* on the western watershed of the Yucatan peninsula *Culicoides furens* is mentioned as a possible vector

Enterobius Infection

CRAM (p 618) sums up the findings of the American workers who have been investigating oxyuriasis since 1936 The life history of the worm is not exactly known because infection of animals is not yet possible Embryonated eggs have been found in dust throughout infested houses and infestation by inhalation is theoretically possible Infection is usually familial and prevention of spread is difficult even strict hygienic measures may fail and eggs cannot be killed by ordinary fumigation methods In Washington the infection rate in white persons of all ages was 41.5 per cent in negroes 12.9 per cent The incidence was highest in children of school age and the infections were not confined to crowded areas or to any social level There is no evidence of association of infection with gastro-intestinal symptoms or appendicitis but the worms may enter the vulva and cause a mucoid discharge and restlessness insomnia feelings of shame and a sense of inferiority are common and are improved with treatment The most successful drug is gentian violet details of dosage of which are given it may cause gastro intestinal upset but this is easily controlled For a single dose treatment tetrachlorethylene is the best medicament

MAZZOTTI and OSORIO (p 617) have compared the Graham swab and the NIH swab in the diagnosis of *E. vermicularis* infection to the advantage of the former

SCHENIEN and MOSS (p 555) examined 1 000 appendices removed from patients at a hospital in New Orleans to assess the incidence of infection with *E. vermicularis* In white patients the incidence was 30.3 per cent in negroes 8.4 the highest rates were in white girls (aged five to nine) 72.4 per cent and in white boys of the same age 66.6 per cent RECTOR (p 927) has found *E. vermicularis* in 4.76 per cent of appendices removed from persons over the age of puberty KUITUNEN EKBAUM and MORGAN (p 328) having examined a series of appendices from children have failed to find any correlation between the presence of *Enterobius vermicularis* and appendicitis NIÑO (p 402) on the other hand thinks that *Enterobius* can cause the appendicular syndrome and quotes two cases in support of his view

Trichuriasis

RAPPAPORT (p 933) found little difference between three strains of *T. spiralis* used to infect mice but there was considerable variation in the response of different mice to the infections He has studied (p 934) the longevity and sex ratio of the adult worms in the intestine and the rapidity of larval development in the musculature For information on these points the original should be consulted

WELLER (p 852) has observed partial development of the larvae of *T. spiralis* in roller tube tissue cultures of chick embryo fragments in

chick plasma clot distributed evenly over the walls of a test tube to which a nutrient medium was added.

FRICHTAL (p 74) shows that a single small dose of larvae of *Trichuris spiralis* given by mouth to rats is capable of producing immunity after a period of about 14 days.

LEVIN and EVANS (p 506) have confirmed a finding of other workers that a dose of X ray can be so adjusted that it will allow the irradiated larvae of *T. spiralis* to develop in the intestinal phase but will prevent the production of larvae. Development of the intestinal phase in rats however will induce a resistance which prevents a second infection and the authors consider that the resistance originates in the intestine of the host rather than as a general response with production of antibodies. The authors suggest the possibility that young pigs may be fed with irradiated larvae to prevent subsequent natural infection so that human trichuriasis may be eradicated but point out that the fate of the irradiated larvae in the pig would have to be studied first. STOWEN (p 403) has investigated the effect of ultraviolet irradiation on the intestinal and muscle phases of *Trichuris spiralis*. The ability of the larvae to establish themselves in the intestine is impaired.

MAETH (p 478) has found the skin test with *T. trichiura* antigen to be a valuable aid to diagnosis more reliable than estimation of eosinophilia and the complement fixation test. In a series of definite cases of infestation both immediate and delayed reactions were positive up to the seventh week. After the sixth week the reactions tend to become weaker or one may be positive and the other negative. The immediate reaction appears as a red or white weal and develops within 30 minutes. The delayed reaction is typically the cockade form seen in the tuberculin reaction with red centre white weal and surrounding erythema. The delayed reaction may be visible two to three days after the injection. By means of this test symptomless cases may be detected but it should be remembered that group reactions may be given by persons infected with other nematodes *Ascaris Trichuris* or *E. stenos*.

LINNEWEG and HARA (p 935) have found that with various antisera prepared from *T. spiralis* skin tests and complement fixation tests are useful for diagnosis but that the precipitin test is not. They prefer antisera derived from rat muscle to those from pig muscle.

PERRIN (p 711) has investigated the keeping property of the Bachman Bouicevich *T. trichiura* antigen (prepared without phenol) he concludes that it cannot be kept in effective condition longer than 18 months.

ALCHER and CAMPBELL (p 325) report the isolation of a polysaccharide from *Trichuris spiralis* which gives good precipitation with sera from infected rabbits and positive skin reactions.

BAFON and BRUNNER (p 477) have been able to sensitize the skins of normal persons by injecting antigens derived from larvae of *T. spiralis* dissected from muscle of infected rabbits. Sensitization may be effected by skin test doses of the antigen and the diagnostic value of these skin tests the effect diminishes with repeated intracutaneous injection. Tests with *Ascaris* antisera indicate that there is a component common to both *Ascaris* and *Trichuris*.

CULBERTSON (p 75) report controlled experiments which show that inoculation of mice with *Trichuris* and vaccination with antisera prepared from the worms protect against subsequent infection. The immunity conferred is effective against the intestinal

phase of the parasite but infestation gives more protection than vaccination. Passive immunization with serum from infected animals also gives protection but this is less effective than that conferred by previous infestation.

The same author (p 77) presents the results of experiments on the effectiveness of passive immunity against *T. spiralis* in rats. After injection of immune serum the development of the worms in the intestine is checked as it is by active immunity but the check is not so effective though there is no reason to suspect a qualitative difference.

CULBERTSON (p 794) sums up his work by stating that the transmission of immunity against *Trichinella spiralis* from mother rats to their young takes place largely or entirely by ingestion of the milk of the immune mother. Little or no transmission occurs during intrauterine life.

Other Nematodes

HOSFORD *et al* (p 257) report the second known case of infection of man with the Spirurid nematode *Thelazia californiensis* a parasite of dogs, sheep and deer. The worms are found in the eye but do not penetrate the conjunctiva. They can therefore easily be washed out. Their life history is not known but presumably an arthropod intermediate host is involved.

KASIMOV (p 326) reports the first case of human infection with the nematode *Ostertagia circumcincta* from Azerbaidjan.

Anthelmintics

BERCOVITZ *et al* (p 929) have investigated the therapeutic value and toxicity of phenothiazine in various infections. Details are given in the original abstract. They conclude that it can produce toxic effects in an appreciable number of patients and that it is not an effective anthelmintic or amoebicide. Most (p 930) has given phenothiazine to 22 patients with mild toxic effect in two. The total dose should not exceed 300 mgm per kgm body weight (i.e. about 15 gm for an adult) given over a period of three to five days. The author however considers gentian violet the drug of choice for *Enterobius* infections.

GRANT (p 932) emphasizes the danger of the use of phenothiazine for the treatment of *Enterobius* infection and quotes a non fatal case of poisoning.

SISK (p 927) has tried phenothiazine in the treatment of *Enterobius* infection. Toxic effects were produced in a number of patients submitted to a five day course but the author considers that for adults and children over the age of six a dose of 1 gm daily for six days followed by a rest for eight days and then by 1 gm daily for six days is successful and safe. Doses for younger children are detailed.

ELLIOTT (pp 702-931) writes favourably of the effect of phenothiazine in various helminthic infections in West African troops but in comment on the effect of this drug on the nematodes of man and animals associated with its administration to man and animals.

MUKERJI and GHOSH (p 922) show that there is progressive deterioration in the ascarid content of oil of chenopodium when kept at 70 to 98 F either in the light or in the dark. The deterioration is more rapid in the first than in the subsequent two years.

ERHARDT (p. 60) and EICHHOLTZ and ERHARDT (p. 61) have written at some length on new anthelmintics with special reference to the phenol derivative 430 H, the composition of which is not more fully given. This product is very effective against *Ancylostoma caninum* and is claimed to be a great advance on the known anthelmintics but it is chemically unstable, has an almost intolerable taste and markedly irritates the mucous membranes. The action of various other drugs on a number of worms is discussed.

JAFFÉ (p. 617) has studied the sap of fig trees which is used as an anthelmintic. The active agent is the proteolytic agent ficin which *in vivo* has a digestive action in alkaline media on *Ascaris* and other nematodes.

Immunity

TALLAFERRO and VARLEY (p. 319) have studied passive immunity to *Nippostrongylus brasiliensis* infection in rat by injecting immune serum into the animals before infection and by noting the response in egg production and in post mortem examination of animal killed some days after infection. Eggs appeared in the faeces after a slight delay as compared with the normal and total egg production was smaller. The rats showed high but transient immunity and the effects on the worms were similar to those seen in animals actively immunized by repeated infections with large numbers of larvae but were less in degree. The inflammatory responses were similar to but of smaller degree than those in actively immunized rats. WATT (p. 797) has produced a marked degree of immunity against *Nippostrongylus brasiliensis* by injecting into rats the filtrate of a saline extract of adult and larval worms. The immunity is effective against the larvae in the lungs and against the intestinal phases of the worm and possibly against larvae in the skin. WATT *et al.* (p. 793) have taken this matter a step further by showing that lack of vitamin A in the diet lowers the resistance of rats to primary infection and to reinfection with *Nippostrongylus brasiliensis*. RILEY (p. 793) reports to the same effect.

Claes W. Leclerc

MALARIA

SIVALINGAM V. Spleen and Parasite Surveys in Ceylon. *J. Malaria Inst. of India* 1943 Dec. v. 5 No. 261-5 3 map.

Spleen and parasite surveys in Ceylon carried out by SIVALINGAM and RUSTOMJEE in the early months of 1938 and 1939 have previously been reported [this *Bulletin* 1941 v. 39 663]. The survey now reported were made in 1940.

Immediately after the conclusion of the 1939 surveys a severe epidemic of malaria broke out involving the endemic areas of low to moderate intensity in the Western and Southern Provinces and the true epidemic zones of the North Western and Sabaragamuwa Provinces. The low to moderately endemic areas round Kandy and Matale were also involved. The dry zone was not affected. The epidemic lasted till the end of July. The results of the 1940 survey reflect the effects of this epidemic.

The dry zone spleen rates were substantially similar to those of previous surveys. There was a rise of 10-20 per cent in the spleen rates in much of the intermediate zone and a great increase in the rates in the northern part of the wet zone which occupies the south west corner of the island. Corresponding changes in the parasite rates were observed.

The parasite rates were based on the examination of the blood of 19 906 schoolboys. The percentages of species of parasite found were dry zone (776 of 8 760 positive) *P. malariae* 37.4 *P. falciparum* 39.4 *P. vivax* 23.2 intermediate zone (237 of 5 401 positive) *P. malariae* 49.6 *P. falciparum* 26.1 *P. vivax* 24.3 wet zone (110 of 5 745 positive) *P. malariae* 40.2 *P. falciparum* 29.5 *P. vivax* 30.4

Norman White

SHIPITSINA N. K. [The Area of Water Surface which is filtered by an *Anopheles* Larva in Feeding] *Med. Parasit. & Parasitic Dis.* Moscow 1943 v. 12 No. 2 14-24 5 figs. [In Russian]

The author studies the activities of the *Anopheles* larva when feeding and the effect of administering precise dosages of poisoned dusts.

When the larva is feeding it produces a centripetal current in the surface layer of water. This current flows towards the mouth brushes for an angular width of 250°. It is strongest in the area immediately in front of the larva. After it has passed the mouth brushes the water goes away at a lower level in two streams which are directed downwards and to the sides.

The fourth stage larva produces a very considerable surface current flowing towards the larva over a radius of 8 mm. and some slight current up to about 20 mm. The area which is filtered by the fourth stage larva is therefore some 8 sq. cm. in the first stage it is about one fortieth of this say 20 sq. mm. Needless to say these figures are much modified by larval activity and so forth. But the differences of effective filtration of large and small larvae are so great as to require to be considered in applying powder poisons.

If the water surface carries much dust this limits and reduces the feeding of the larvae and this is particularly true of those of the first instar.

When Paris green is applied to the water under laboratory conditions it may be about equally effective against the first and fourth stage larvae. But as the author rightly observes the dose per unit area has to be greatly increased in the field if one wishes to kill those in the first instar. It seems true that both existing methods of application and also the dusts themselves are imperfect.

[This author has already published a series of studies on the feeding habits of *Anopheles* larvae: the area of surface from which they can filter their food, the number of floating particles swallowed per minute and the effect of temperature, density of particles and so forth. It seems probable that this paper which is evidently important brings together much of the information which she has published before.]

P. A. Buxton

WHITE R SENIOR ADHIKARI A K RAMAKRISHNA V & ROY B B
On Malaria Transmission on the Orissa Coastal Plain *J Malaria
Inst of India* 1943 Dec 15 No 2 159-86 [14 refs]

This is a report of investigations carried out by the Bengal Nagpur Railway malaria staff between 1935 and 1942

The Orissa coastal plain is a strip of alluvium extending from Puri to the northern boundary of the Province 172 miles. It lies between the Singhbhum hills and the Bay of Bengal and is nowhere wider than 100 miles. It is crossed by the Subarnareka Barabalong Salindi Bhaitarani Brahmini and Mahanaddi rivers. A series of more or less derelict canals run across the line of drainage. The riverain tracts are liable to serious flood.

Fifteen species of anophelines have been found in the plain. *A. hyrcanus*, *A. barbirostris*, *A. subpictus*, *A. viaus*, *A. sundanicus*, *A. culicifacies*, *A. fluminalis*, *A. annularis*, *A. aconitus*, *A. jeyporiensis*, *A. kerrarii*, *A. tessellatus*, *A. splendidus*, *A. ramsayi*, *A. jamesi*, *A. annularis*, *A. pallidus* and *A. philippinensis*. Several of these species are rarities. *A. annularis* is much the most prevalent and formed 71 per cent of all collections made for dissection. *A. pallidus* formed 11 per cent, *A. aconitus* 7 per cent and *A. culicifacies* 6 per cent. Only two species have been found with sporozoites, *A. aconitus* and *A. annularis*. Three other species have been found with oocysts on a single occasion each, *A. culicifacies*, *A. pallidus* and *A. ramsayi*. In all 12987 dissections of 13 species caught mainly in houses were carried out.

The principal vector on the coastal plain as a whole is *A. annularis*. It breeds in still water containing floating vegetation and filamentous algal growth chiefly in tanks and ricefields. Its transmission season extends from September to November or possibly December. It is more common in cowshed than in human habitations but shows an increasing tendency to enter the latter in November. Its adult life is greatly prolonged in autumn at which season it breeds with maximum intensity.

A. aconitus in certain places as the only vector incriminated during seven years' work. Its breeding places are similar to those of *A. annularis* but water in slow movement is rather more favoured. It transmits from September to December. Its greatest density is from January to March when however it has not been found infective. Its infection rates were twice as high as those of *A. annularis* but the density of the latter is ten times greater.

Malaria epidemics in Orissa are superimposed on a considerable endemicity; they are very local and apparently dependent on biological factors favouring *A. annularis*.

Very detailed protocol accompanies the report. Norman White

WHITE R SENIOR & RAO V V On Malaria Transmission around
Vizapatnam *J Malaria Inst of India* 1943 Dec 15 No 2
187-205 [19 refs]

Vizapatnam is situated on the only short stretch of the 1000 mile Indian coast of the Bay of Bengal on which spurs of the Eastern Ghats now come down to the sea. It is a relatively healthy area but it has long been known that malaria is a considerable problem in the neighbourhood of Vizapatnam. In 1925 when work was started to convert

part of the shallow protected backwater into a deepwater port malaria surveys were undertaken. These appeared to show that *A. culicifacies* was the vector. When control work was started in the adjacent railway area of Waltair in 1927 and at Gopalapatnam junction four miles to the west in 1930 special attention was paid to *A. culicifacies* *Anopheles* of the *funestus* group and *A. stephensi*. The control was effective. Twenty two species of *Anopheles* have been found in this area but only 14 of these are other than rarities.

Subsequent long continued observations in villages and places round Vizagapatam are described in detail. They indicate that *A. culicifacies* is not a vector locally. The single specimen found with sporozoites may have owed its infection to artificial conditions. *A. stephensi mysorensis* with a sporozoite rate of 1.75 per cent is the principal rural vector. It has been found infected in August, October, November, January and February. Nalas and irrigation channels are the preferred breeding places of this species (79 per cent). *pucca* wells are more attractive than *kutchas* wells as breeding grounds for the remaining 21 per cent. *A. varuna* had a sporozoite rate of 0.017 per cent. It showed very little inclination to bite man and was rarely found in human dwellings. In these respects it differs from *A. varuna* of the Jeypore Hills where it is an important vector. It is interesting to note that the eggs of the Vizagapatam *A. varuna* are definitely shorter than those of *A. varuna* of the Singhbhum Hills. The species can be neglected as a factor in malaria epidemiology around Vizagapatam.

Norman White

WHITE R. Senior. On Malaria Transmission in the Hazaribagh Ranges, including Ranchi Plateau. *J. Malaria Inst. of India* 1943 Dec. v. 5 No. 2 207-31. 1 map & 1 graph.

The large tract of country forming the subject of this paper is an eastern extension of the Eastern Satpura Ranges malaria transmission in which was described by the author and ADHIKARI in a previous publication [this *Bulletin* 1941 v. 38 560]. The work now described was started in 1936 and the conclusions are based on the results of dissection of 17,500 *Anopheles*. Collections of *Anopheles* were made in places in the Korea Coalfield area in the Eastern States Agency area through which the main Bombay Calcutta railway line passes in Jharsuguda (a town in the extreme north west of Orissa) and on the Ranchi plateau. The recorded anopheline fauna of this large area comprises 21 species which are listed.

Very diverse malaria conditions prevail in different parts of the Hazaribagh Ranges. At the eastern end epidemicity is superimposed on endemicity. The west and south are hyperendemic areas. Conditions in the centre of the ranges where communications are difficult are unknown. The principal malaria vector of the Hazaribagh Ranges is *A. fluviatilis* it transmits the disease from September to March. *A. varuna* is comparatively rare it formed only 6 per cent of adults of the *fluviatilis* *varuna* group captured. It thus probably plays an unimportant part in transmission though it is the only species that has so far been found infective in the Korea Coalfield. *A. culicifacies* transmits to some extent from July to September it is responsible for moderate endemicity on the Ranchi Plateau.

The town of Jharsuguda some miles from the southern face of the hills on black cotton soil was reputed to be very healthy. In 1940

there was an epidemic of malaria caused apparently by an increased breeding of both races of *A. stephensi* in the more than 500 wells of the town
 Norman White

PRITCHARD A. E. & PRATT H. D. I. A Comparison of Light Trap and Animal Bait Trap Anopheline Mosquito Collections in Puerto Rico II. A List of the Mosquitoes of Puerto Rico. *Pub Health Rep Wash* 1944 Feb 18 v 59 No 7 271-33 7 figs (2 on pls)

The authors carried out experiments lasting over several months in Porto Rico in which the catches of anopheline mosquitoes mainly *Anopheles albimanus* in a light trap were compared with those in an animal bait trap. The two types of trap were situated from 200 to 500 feet apart. The light trap consisted of a vertical metal cylinder nine inches in diameter and twelve inches long. The upper end carried a fan. A short distance above the cylinder there was an inverted funnel shaped roof carrying an electric light bulb (25-60 watts). The insects which entered under the roof were blown into a cyanide killing bottle by means of the fan. The animal trap consisted of a hut 8 feet long by 5½ feet wide and 5½ feet high. There was a V shaped entrance along each side and the upper half of the walls consisted of mosquito netting. The trap was baited with a small horse or a calf.

The tests carried out led to the following conclusions concerning *Anopheles albimanus*. The light trap provides a more standardized and easily managed way of sampling the mosquito population since the intensity of the light can be controlled and by means of a time switch the apparatus can be made automatic. The catch can be collected at any time. The apparatus is portable and catches both males and females and the latter may be fed or unfed. The animal trap possesses none of these advantages but on the other hand it can be run in remote places since it needs no electric supply and also it has the advantage that the catch is not mixed up with a very large number of other night flying insects. It is suggested that the combined use of the two types of trap would give the best results.

The light trap caught very many more *A. albimanus* than the animal trap in both collections at the former ranging from 370 to 828 when the animal trap caught a maximum of 245. It often happened therefore that the light trap collected significant numbers of these mosquitoes when the animal trap gave numbers below the five females per night or fewer accepted as a criterion of satisfactory control in Porto Rico. (It has recently been shown (WEATHERSBEE *this Bulletin* 1944 v 41 643) that the horse is a very much more satisfactory and attractive bait for *A. albimanus* than man the latter gave low catches in comparison.) The paper gives some information on two other species of considerably less importance *A. testispennis* and *A. griffithsi* and a list of Porto Rican mosquitoes is appended. W. A. L. David

Malarial Vectors in Areas Investigated by the Inter American Co-operative Health Services. 3 mimeographed pp.

This information has been compiled in the Medical Section of the Division of Health and Statistics in collaboration with Mr W. H. W. Thompson, Entomologist. It contains lists of vectors and probable hosts of most of the Central and South American R. publicis.

SCHILLING C Nachweis von Antikörpern im Blute Malaria-kranker
[Antibodies in the Blood of Malaria Patients] *Ztschr f Immunitätsf u Exper Therap* 1943 Dec 11 v 104 No 2/5
212-19 1 fig

In 1933 NEUMANN [this *Bulletin* 1933 v 30 859 *ibid* 1934 v 31 190 (title)] reported experiments the results of which appeared to indicate the presence of antibodies in the blood after an attack of malaria. The experiments were carried out by removing infected blood from a patient before an impending attack and keeping it in the cold. After the malarial attack blood was again withdrawn and the serum separated. A quantity of this serum was added to a portion of the parasite-containing blood which had been kept in the cold. It was found that the mixture of blood and serum failed to produce infection when injected whereas the original blood in four cases was proved to be fully virulent. It was concluded that the serum contained antibody which was capable of destroying the malaria parasites. In the present paper the author has extended these observations by 11 tests on nine cases. The results indicate that antibodies can be detected in the blood as early as seven hours after the height of the fever but they can be demonstrated most readily between the twelfth and eighteenth hours. After this it was no longer possible to demonstrate their presence.

C M Wenyon

DRYON K C Post mortem Appearances of Malignant Tertian Parasites
[Memoranda] *Brit Med J* 1944 June 24 845

Referring to a fatal case of cerebral malaria [SNEDDON this *Bulletin* 1944 v 41 259] in which malaria parasites could not be stained in sections of the brain the author mentions the relatively simple method of confirming a diagnosis by staining smears of the brain (and spleen) with Leishman's stain. In smears of the cerebral cortex chains of parasites are seen occluding the cerebral capillaries. The parasites stain blue and each contains a dark mass of pigment. The red cells in which the parasites are contained are not readily distinguishable however. Most of the parasites appear to be schizonts. In smears of the spleen enormous numbers of schizonts are seen in all stages of schizogony. This method is rapid and better for the purpose than preparing sections. [In circumstances where opening the skull is not practicable the method of obtaining brain tissue for smears by means of a large exploring needle attached to a syringe passed through the orbital plate of the frontal bone under the eyelid would be useful—see DANIELS and NEWHAM *Laboratory Studies in Tropical Medicine* 5th Ed 1923 p 131 Bale London see also RAJA this *Bulletin* 1922 v 19 864]

J F Corson

HAMBURGER H J Clinical Observations on Malaria Cases with
Dangerous Cerebral Manifestations *Indian Med Ga* 1944
Jan v 79 No 1 10-12

The author describes six cases of cerebral malaria two of which terminated fatally in spite of intensive treatment. The diagnosis in one or two of these cases was not very definitely established. The clinical notes form the text of some general observations on cerebral malaria. Sugar or albumin in the urine is a sign of imminent danger.

The absence of plethoric enlargement in such grave cases may be an indication of weakness of the defence system. A fixed temperature round 101 F seem to point to affection of the heat centre possibly due to anaemia caused by blocking of parasite-filled capillaries. It is at any rate a sign of danger. Infusion therapy should be handled carefully; it is not certain if the brain be in a state of oedema or of dehydration in such cases.

Norman White

YOUNG C B & MACADEN C J A Cerebral Malaria [Correspondence] *Brit Med J* 1944 May 13 670

Writing from India Young and Macaden condemn the intravenous injection of quinine as the first step in the treatment of cerebral malaria. They state that large intravenous doses are invariably followed by death. Their procedure is to give an intramuscular injection of quinine as soon as diagnosis is confirmed. If the patient is very collapsed a small intravenous saline may be given at this time but never intravenous quinine. Four to six hours later a small intravenous injection of quinine is given. 3 to 6 grains are ample. This may be repeated to a total of three injections at intervals of four to six hours. Adrenaline if given at all is given intramuscularly just before the intravenous quinine. They report good results.

Charles Wilcocks

SEELIG S F & HEILING J R Mergalocytic Anaemia as a Sequel to Malaria. *La* 1944 Apr 15 498-9

The observations recorded were made in a combined general hospital or field service which received and evacuated large numbers of cases of malarial infection. Many patients with a history of recent fever who were actually suffering from malaria (*Plasmodium* infections) presented the picture of pernicious anaemia without involvement of nerve tissue. The blood findings in 23 of these patients are given. All the patients were Indians. All cases showed a severe megalocytic anaemia with considerable anisopoikilocytosis, frequent punctate basophils, a small and large nucleated red cells, leucopenia and well marked hyperchromasia. Antimalaria treatment supplemented by iron, liver and a full diet was successful. The cases were considered to be tropical or nutritional megalocytic anaemia in patients who had been exposed to severe hardship and broke down under the added stress of malaria. The inadequate treatment of the malaria, the relatively late diagnosis of the anaemia and delay in starting effective iron and liver treatment were contributory factors.

Norman White

KIKUTH W Zur Frage der Fröhjarsrezidive der Malaria tertiana. Spring Relapses in Cases of Tertian Malaria. *Ztsch f Immunitätsf Exper Therap* 1943 Dec 11 104 No 23 148-57

It is now well known that in Europe cases of benign tertian malaria are very liable to suffer relapse in the spring of the year following that in which the infection was contracted and this in spite of vigorous treatment at the time the first malarial attacks occurred. Furthermore certain patients suffer from their first attack in spring though infection undoubtedly occurred in the previous year. In such cases there has been an incubation or latent period of eight or nine months. In the paper under review the author discusses these phenomena in the light

of present knowledge particularly that concerning the development of sporozoites in cells other than red blood corpuscles leading to the exoerythrocytic cycle of development. It was thought at one time that changes in climate associated with the advent of spring and the more active life of the individual at that time of the year might be responsible for the spring relapse. It was shown however by SWELLENGRIBEL JAMES [this *Bulletin* 1931 v 28 566] and others that this tendency to prolonged latency was not a feature of all strains of *Plasmodium vivax* while paralytics experimentally infected at different times of the year still relapsed after eight or nine months without any special reference to spring. It was thus clear that the tendency to relapse after an eight or nine month interval was a feature of certain strains of *P. vivax* particularly those of European origin and that it was not dependent on factors outside the parasite itself. The author notes that before the discovery of the exoerythrocytic forms in bird malaria it was usually assumed that a small number of erythrocytic parasites persisted in the circulation and that it was there that they became active after the long latent period. Now it is more generally held that it is the exoerythrocytic stages which persist in these cases, and it is they which become active to re-establish the blood infection which gives rise to the spring relapse.

On the subject of treatment the author notes that it has been clearly demonstrated that in bird malaria none of the known therapeutic agents is able to influence the exoerythrocytic stages though plasmoquine has been shown to have a slight action. It is assumed that human malaria behaves in the same way. In support of this are the observations that the tendency of benign tertian malaria to relapse is lessened to some extent if the eradication of the blood infection is associated with or followed by a course of plasmoquine. Thus a number of observers have shown that a 21 day course of quinine with a daily dose of 0.02 to 0.03 gm. of plasmoquine will reduce appreciably the relapse rate of benign tertian malaria. A similar reduction according to PIEBENGA [this *Bulletin* 1932 v 29 710] followed a two weeks course of three tablets daily of quinoplasmin (0.3 gm. of quinine and 0.03 gm. of plasmoquine). [KILUTH here has made a mistake. Each of the tablets used by PIEBENGA contained 0.3 gm. of quinine sulphate and 0.01 gm. of plasmoquine.] Other workers have reported still better results when this treatment was extended to three weeks.

When attempts are made to extend the combined quinine plasmoquine treatment to atebrin and plasmoquine certain unforeseen difficulties are encountered. Thus the daily administration of 0.3 gm. of atebrin and 0.03 gm. of plasmoquine produces certain unpleasant toxic symptoms which the author regards as of a synergic nature. Similar results are obtained when a five to seven day course of atebrin is followed by a three day course of 0.02 to 0.03 gm. of plasmoquine. To overcome this difficulty the Atepe tablet consisting of 0.1 gm. of atebrin and 0.005 gm. of plasmoquine was introduced. All observers are agreed that from the point of view of suppression of relapses the combined atebrin plasmoquine treatment even when the dose of the latter is at a minimum as in the Atepe tablets is very successful. It does not appear however that anyone has carried out a careful comparative test with the quinine plasmoquine treatment so that it is not possible to state to what extent the one is better than the other. Such a comparison was indeed made by ASRI and BOYD in India [this

Bulletin 1937 v. 34 p. 2] but this had reference only to the early relapses of benign tertian malaria for the long term relapse is not a feature of Indian malaria. In fact it would seem impossible to carry out a satisfactory test on suppression of the long term relapse in the tropics where chances of reinfection are common. There are thus insufficient data available to answer the question whether some sort of continuation of atabrin and plasmoquine administered over three weeks will or will not be more effective in reducing the incidence of the long term or primary relapses of *P. falciparum* infections than the three weeks plasmoquine treatment of PIEBENGA and VAN ANDEL in the case of European malaria. C. M. Henyon

RODGER L. M. Malaria as a Non Relapsing Disease A Review of 1 619 Cases in Northern Rhodesia Laet 1944 Apr 29 p. 33-4

The author gives an interesting account of his experience of malaria on a mission in the copper belt of Northern Rhodesia. Malaria is hyperendemic in the neighbourhood of native children has spleen and parasite indices of from 50 to 60 per cent. The European community of 2000 live in an area so well protected by antilarval and antimosquito measures that the average expectation of an attack of malaria is once in seven to eight years. European employees over 1000 in number are not allowed a day off work or allowed to return to work without a medical certificate. No quinine is issued except during treatment. Every patient is treated in hospital. No antimalaria treatment is given unless parasites have been found in the blood. Thus almost all opportunistic infections are most numerous. Among supervisory *P. falciparum* infections are most numerous. Among 1157 persons infected during a five year period *P. falciparum* as found in 18 *P. malariae* in 20 and *P. ovale* in 77. The species of parasite as undetermined in 38.

The routine treatment of malaria consists of 10 grains of quinine by mouth three times a day for nine days after this the employee returns to work but 1 grain 15 grains of quinine a day for a week. If in the initial stage the patient is seriously ill or complains of nausea quinine is given intravenously twice a day for one or two days. For intravenous injection 10 grains of quinine hydrochloride in 20 cc distilled water are given in not less than fifteen minutes and preferably when the temperature is not over 100 F. Intramuscular injections are given only to young children. Mepacrine is used if there be a history of blackwater fever or quinine diosynrasy. 0.1 gm thrice daily for seven days. Intravenous mepacrine is given if necessary 0.15 to 0.2 gm. *P. ovale* infections are treated with quino-plasmoquine and are among a series of *P. malariae* infections.

The chief interest of the paper is the very low relapse rate of cases of malaria that have been adequately treated. During the five year period 77.7 per cent of infected persons suffered no second attack. Among the remaining 22.3 per cent a large proportion of second attacks appear to have been due to reinfections. Cases of malaria are for obvious reasons more numerous along the outskirts than in the centre. This is shown by the distribution of cases. Cases of malaria are for obvious reasons more numerous along the outskirts than in the centre. The author concludes that malaria can be a non relapsing disease provided that it is treated at once and treatment is completely supervised. It is one of the essentially curable diseases. Norman White

EDGE P G Malaria and Nephritis in the British West Indies *Caribbean Med J* 1944 v 6 No 1 32-43

In this paper EDGE has attempted from an examination of the data given in the Annual Medical Reports and the Reports of the Registrars General of 14 of the British West Indian Colonies to determine whether malaria and nephritis are so closely associated that malaria may reasonably be regarded as an important cause of nephritis and whether some particular species of *Plasmodium* is the responsible agent

The number of deaths certified as due to nephritis in these Colonies is high almost as high as the number certified as due to malaria and in general it is observed that where the malaria rates are high the nephritis rates are also high though there are notable exceptions For instance Bermuda has a high nephritis rate but malaria is practically non-existent The same is true of Barbados On the other hand in Ceylon and the Federated Malay States the proportion of hospital in patients treated for malaria is high and the proportion treated for nephritis is relatively low in comparison with the West Indies Yet in West Africa an area even more malarious than the Far East the in patients treated for malaria are relatively few and those treated for nephritis form a greater proportion even than in the West Indies It is of course probable that in this hyperendemic area where immunity plays so large a part in the course of malaria in adults relatively little in patient treatment is given In that case the in patient figures do not represent the true incidence of malaria but it is not clear why the same reasoning does not apply to Ceylon and the Federated Malay States The explanation may be that hospital accommodation and communications are better in the far east

GIGLIOLI [this *Bulletin* 1930 v 27 508] holds the view that malarial nephritis is closely associated with *P. malariae* infections In the present enquiry Edge has failed to find data which throw light on this question

The author concludes by observing that official records are of little value for the investigation of scientific problems of this kind and urges the importance of good medical book keeping

Charles Wilcocks

JOHANNESSEN F Was ist Prochinin? (Composition and Uses of Prochinin) *Munch med Woch* 1943 Nov 5 v 90 No 44/45 635-6

Prochinin introduced as a war time substitute for quinine is a mixture of cinchonine (47.5 per cent) cinchonidine (47.5 per cent) and quinidine (5 per cent) Chemotherapeutic tests on mice rats rabbits guinea-pigs and canaries tests of its inhibitory action on diastase pepsin and yeast of its effect on fever blood pressure hyperglycaemia and on smooth muscle and of its excretion in the urine all gave very similar results to those obtained with quinine

It has been used clinically in Greece a daily dose of 1.5 gm was given for benign tertian malaria the blood became free from parasites on the fourth day at latest on the eighth day and fever ceased on the fourth day After 20 days treatment relapses occurred in 7 per cent In hyperthyroidism 0.2 gm three times a day sometimes combined with phenobarbitone (luminal) was successful In arrhythmia and extrasystole doses of 0.08 to 0.4 gm several times a day gave good

results In ob tetras a dose of 0.25 gm repeated after an hour & as given after rupture of the membranes to promote parturition
J F Corson

SCUD J V JELINEK Viola C & KUNA S Biochemical Aspects of the Toxicity of Atribrine I Acute Effects of Massive Doses in the Rat J Pharm & Exper Therap 1944 Feb 1 80 No 2 144-9 [20 refs]

Groups of 50-80 rats were given by stomach tube a dose of mepacrine (atabrine) equivalent to 50 per cent of the LD 50 (dose causing 50 per cent mortality) i.e. 450 mgm per kgm. Group I rats (without prior fasting) no rats died. Group II rats had fasted overnight 2 per cent died in 30-60 minutes. Group III rats had fasted 36 hours 48 per cent died acutely. Group IV rats had been maintained on a low protein diet and then made to fast for 36 hours 8 per cent died acutely. In a fifth group the animals were killed 2-48 hours after the dose and then treated with a dose 70 per cent of the LD 50. In all groups the surviving animals were taken for examination after the dose and the blood and organs were examined. At post mortem all the animals showed gastro-intestinal tract distended with fluid. The contents of the small intestine were serous in nature and in 5-10 per cent of the animals there was acidosis. The biochemical examination of the surviving animals had diarrhoea. The rats were produced showed that severe dehydration and severe acidosis were produced within 6 hours after the administration of mepacrine. These conditions were maximal at six hours. Later (24-48 hours) a chloride deficit occurred in the blood. Severe necrosis occurred in the heart (See also). As judged by the retention of brom sulphalein and prothrombin time, the drug increased by fasting plasma fibrinogen concentration and this inhibition was appreciably increased by the drug.

F Hawking

SCUD J V & HALLIV Margaret T Biochemical Aspects of the Toxicity of Atribrine II The Influence of the Diet upon the Effects produced by Repeated Doses of the Drug J Pharm & Exper Therap 1944 Feb 80 No 2 150-59 [2 refs]

Four groups of about 25 rats each were kept on diets low protein—low fat—low protein—high fat—high protein—low fat and high protein—high fat respectively. After a cerebral examination the rats were given 4.5 mgm mepacrine (atabrine) per 100 gm by stomach tube daily for six days each. The rats were killed after 3, 7 and 24 days respectively and the blood and organs were taken for examination. Various tests for liver function etc. gave no consistent evidence of icteric index, prothrombin time etc. except those on the high protein—low fat diet in which the values were abnormality. The plasma fibrinogen was usually associated with inflammation and tissue destruction and appear to be a sensitive indicator of mepacrine toxicity. All the animals (except those on the high protein—low fat diet which remained normal) lost weight and suffered from diarrhoea while the mepacrine was given. It is concluded

that the toxic effects of this dosage of mepacrine for rats could be largely prevented by a high protein—low fat diet

Further experiments were done with dogs. In the first experiment two dogs were given 50 mgm of mepacrine per kgm daily while three other dogs were given 25, 10 and 5 mgm doses respectively. The dogs receiving 25–50 mgm per kgm daily showed loss in weight, diminished food intake, anorexia, vomiting and diarrhoea within 3–6 weeks. The plasma fibrinogen was increased in these animals but in two of them it tended to return towards normal levels as the experiment proceeded. It is considered that the increase of plasma fibrinogen indicates destruction of liver tissue. The dogs on 5–10 mgm per kgm doses suffered from no marked symptoms even after 3–5 months.

The second experiment was performed on four dogs which had been subjected to severe depletion of protein by being kept on a low protein diet for three months. Two dogs similarly depleted of protein were observed as controls. The four dogs were given mepacrine 10 mgm per kgm daily by mouth for six days each week. The dogs which received mepacrine showed increase of plasma fibrinogen after 13 doses and after 31 doses the average value was 444 mgm per 100 cc (average in control dogs 264 mgm per 100 cc). In the previous experiment a dog given 10 mgm per kgm daily but receiving a normal diet did not show an elevation of plasma fibrinogen even after four months treatment while one which received 25 mgm per kgm daily showed augmented plasma fibrinogen only after one month. When the protein depleted dogs were placed on high protein diets the change in the plasma fibrinogen due to mepacrine was reversed. In dogs treated with mepacrine there was no albuminuria or other evidence of renal damage.

I. Hawking

BALLARD C W & PIERCE J S. The Assay of Pamaquin. *Quarterly J Pharm & Pharmacol* 1944 Jan Mar v 17 No 1 30–38 1 fig

FREEBORN S B. Problems created by Returning Malaria Carriers. *Pub Health Rep* Wash 1944 Mar 17 v 59 No 11 357–63

A very small proportion of troops now in the United States have as yet seen foreign service but already 75 per cent of the malaria among troops in the Continental United States is of foreign origin. United States troops are stationed or engaged in nearly all the most important malaria centres of the world. Very large numbers of carriers may be expected when troops return from the fighting fronts. It would be quite impracticable to keep such troops under surveillance sufficiently long as to insure that they were free from infection before returning to their homes. As a solution to the problem Dr I. L. WILLIAMS Jr proposed eradicating malaria from the United States by anti anopheline attack in the endemic areas and the creation of mobile anti anopheline units to control the expected explosive epidemic outside such areas. A consideration of the factors that have contributed to the shrinkage of the geographical distribution of malaria in the States from practically the whole country in 1880 to the south eastern States at the present time indicates that an eradication problem is feasible and that if proper precautions be taken there need be little fear of malaria epidemics caused by the return of carriers from the theatres of war.

The Public Health Service is at present undertaking anti anopheline programmes with the co operation of 20 States, the District of Colombia

and Porto Rico. In addition work is being done on 12 city programmes for the prevention of yellow fever and dengue in five States and the Territory of Hawaii. The antimalaria programmes are concentrated on war area. Army and Navy establishments critical war industries and congregating recreational or housing areas for service men. As there will be comparatively heavy concentrations of potential malaria carriers at all general hospitals their sites have all been surveyed and if mosquito vectors are present they are kept under inspection and control measures are applied. Malaria mosquito densities become moderately serious. Similar precautions have been taken with regard to prisoner-of-war camps.

More serious are cases of malaria occurring among members of the armed forces after their return home when they are not under close medical observation. The degree of vigilance of the local county and State health authorities will decide how serious the establishment of each small focus of infection is to become. An explosive epidemic of 53 cases last summer in an area in which transmission has been yielded to an anti mosquito and interior spraying programme. A skeleton team of entomologists and engineers has been established in all the Public Health Service districts not included in the regular programme. These units keep under observation all places in which there are concentrations of malaria carriers. They will have one or more mobile control units which will be available at the request of the State for the suppression of localized outbreaks wherever they may occur.

Norman White

CARNEY S P & LEVIN J B Chronic Malarial Parasitemia in Italian Prisoners of War J Amer Med Ass 1944 Apr 8 : 124

The observations recorded were made in an Italian Prisoners of War Camp with a population of nearly 3000 in an area where the absence of anopheline vectors makes local transmission impossible. All the prisoners had come from North Africa. The average length of service in malarious regions as to years. A blood examination of the men was made as a prelude to sending some of the men to work on farms, some of the proposed side camps were many miles from army hospital facilities.

Thick and thin blood smears were made from each man on each of two occasions at least 10 days apart. The total number of men examined was 723. 257 harboured parasites 97 per cent. A few were *P. falciparum* and two *P. malaria*. Cases of acute malaria numbered 56. These ceased abruptly with the onset of cooler autumn weather. Such an examination as was carried out does not reveal all carriers of infection. One patient was admitted to hospital with malaria only a week after a negative result to blood examination. Only a small proportion of men harbouring parasites gave a history of having suffered from malaria. More than half the men with active malaria denied previous attacks.

Norman White

BONFORD R R The Human Factor in Military Malaria Control. Lancet 1944 June 10 750-53

These observations relate to the staff of a general hospital in a relatively healthy station in West Africa during 1941 and 1942 and

were designed to determine the reasons why some individuals get more malaria than do others. The results are inconclusive as they relate to only a small body of men but they are suggestive and indicate the need for further study.

Exactly 100 other ranks served with the unit continuously over a period of 13 months. These men had 156 attacks of malaria (2 000 man days in hospital). 27 had no attack, 29 had one attack, 22 two, 11 three, 7 four, 3 five, 0 six, and 1 seven. The attack rate per month according to rank seems significant: Officers 1.7, Sisters 1.9, Sergeants 7.7, Corporals 11.3, and Privates 14.2 per cent. The explanation is thought to lie in the better housing and feeding and better facilities for rest and recreation of the higher ranks. The incidence in other ranks doing night duty was 14.8 per cent per month as compared with 8.8 in those doing no night duty. The incidence of malaria was not related to the use of alcohol nor to obvious ill discipline and carelessness in other respects. Soldiers who had no mosquito net for one to three nights after arrival and no mosquito boots had a shorter average period before developing malaria than had the whole group.

The most sudden and serious rise in malaria incidence coincided with an outbreak of severe diarrhoea traced to the breaking of a fly trap of a large native latrine which affected 44.6 per cent of the unit. During this time the diarrhoea group had 60 per cent more malaria than the non diarrhoea group.

From the small number of observations it would seem that individuals have a varying liability to attacks of malaria and that the assumption that a high incidence of malaria must be due to carelessness was not confirmed. Individual resistance is related to the general state of health and inadequate convalescence is a potent cause of early relapse. The maintenance of the highest possible state of general health and attention to all social factors are important.

Norman White

BOYD M F. Present Day Problems of Malaria Infections. *J Amer Med Ass* 1944 Apr 22 v 124 No 17 1179-87 8 charts [Refs in footnotes]

BISHOP Ann & GILCHRIST Barbara M. A Method for collecting Sporozoites of *Plasmodium gallinaceum* by feeding Infected *Aedes aegypti* through Animal Membranes. *Nature* 1944 June 10 713-14

The authors have found that the mosquito *Aedes aegypti* will feed through a chick skin membrane stretched over the end of a glass tube containing heparinized chicken blood. If the blood is from a bird infected with *Plasmodium gallinaceum* the mosquitoes will become infected as readily as if they had fed on the chick itself. It was also found that infected mosquitoes feeding through a membrane on uninfected blood injected sporozoites into the blood. Such sporozoite-infected blood produced infections when injected into chicks. It is evident that by this technique it is possible to obtain suspensions of sporozoites free from salivary gland tissues as hitherto the only means of obtaining sporozoites was by dissection of the mosquitoes' salivary glands. Furthermore it will be possible to test the action of chemotherapeutic agents on sporozoites in these suspensions. The membranes are prepared by soaking the skin of a 1-3 week-old chick in absolute alcohol for at least 30 minutes, washing it in running tap water and

stretching it over a piece of glass tubing 2.5 cm by 6 cm and keeping it in place till dry by a thin rubber band. When dry the skin thin and parchment like is firmly adherent to the end of the glass tube. The highest rate of gorging occurs when the contained blood (1.5-3 cc of heparinized chick blood) is kept warmed to 41-42°C and the surface of the membrane is moistened with saliva. The membrane is placed in contact with the netting over the mosquito jar and the whole kept in the dark in an incubator at 29°C in a moist atmosphere.

C M Wenyon

HAWKING F. Tissue Culture of Malaria Parasites (*Plasmodium gallinaceum*). *Lancet* 1944 May 27 693-4 4 figs

In this preliminary communication the author reports the successful culture of the exoerythrocytic schizonts of *Plasmodium gallinaceum*. This was effected by continuous tissue cultures from the spleen, liver, marrow and brain of infected chicks. Growth of the tissues continued for fifteen days when smears suitably stained showed various stages of development of the schizonts including large multinuclear forms and groups of uninucleate bodies which appeared to be merozoites. That multiplication had actually occurred was indicated by the large number of parasites present on the fifteenth day. Chicks were successfully infected by inoculation of eighth and ninth day culture material.

C M Wenyon

BARRETTO M P. Malaria aviaria. III. Sobre o encotro de formas exo-eritrocitárias do *Plasmodium juxtanucleare* Versiani e Gomes 1941 (Nota prévia). [Avian Malaria. Exo-erythrocytic Forms of *P. juxtanucleare*]. *Hospital* Rio de Janeiro 1943 Nov. v. 24 No 5 643-5 3 figs. English summary.

Examining tissue smears from five chickens infected with *Plasmodium juxtanucleare* Versiani and Gomes 1941 the author found rare unpigmented parasites in endothelial cells of the brain of two birds. One chicken was killed when the primary attack was ending and the other during the first relapse. In smears from spleen, liver, bone marrow and lungs exo-erythrocytic parasites were not seen.

PESOA S B & BARRETTO M P. Malaria aviaria. IV. Investigações sobre a ação de algumas novas sulfonas. [Avian Malaria. Action of New Sulphonates]. *Hospital* Rio de Janeiro 1943 No. v. 24 No 5 647-50 [13 refs.] English summary.

Using Roehl's method in canaries infected with *P. cathemerium* the authors investigated the action of the following compounds:

- 4 Nitro-4 acetilamido-diphenylsulfone
- 4 Nitro-4 amino-diphenylsulfone
- Sodium salt of 4,4'-diphenylsulfon-4 Nitro-4 azosalicilic
- Sodium salt of 4 Nitro-4 carboxypropion amido-diphenylsulfone
- 4 Nitro-4 propionilamido-diphenylsulfone
- 4 Nitro-4 carboxyacilamido-diphenylsulfone
- 4 Nitro-4 carboxybenzylamino-diphenylsulfone
- 4 Nitro-4 butirilamino-diphenylsulfone
- 4 Nitro-4 benzoylamino-diphenylsulfone

4 Nitro-4' valerianamino diphenylsulfone
 4 Nitro-4 formilamino diphenylsulfone
 4 Nitro 4 thiourein diphenylsulfone
 4 Nitro-4 diaminophenylazo diphenylsulfone

The results obtained showed that these compounds have no action against *cathemerium* infections when administered by oral route

BLACKWATER FEVER

GREGORY J R A Short Note on Blackwater Fever *East African Med J* 1944 Apr 1 21 No 4 98-100

The author treats the vomiting and restlessness which occur in blackwater fever by the intramuscular injection of Phenobarbitonum Solubile B P [luminal sodium] in adults he usually injects 10 grains first and a further 5 grains two hours later if restlessness is still present. This does not hinder the giving of sodium bicarbonate solution every two hours by mouth. Two cases in children are mentioned a girl aged seven years was given by mouth an initial dose of 3 grains followed by 1½ grains four hourly for four doses making a total of 9 grains a boy aged six years also received an initial dose by mouth of 3 grains followed by 1½ grains three hourly for three doses making a total of 7½ grains. In both cases vomiting was controlled by the initial dose. The author contradicts the statement by BURKITT [this *Bulletin* 1943 v 40 677] that the former gives the drug intravenously

J F Corson

TRY PANOSOMIASIS

SCOTT J G Eye Changes in Trypanosomiasis *J Trop Med & Hyg* 1944 Apr-May 1 47 No 2 15-17 [23 refs]

The author examined the eyes of 150 Africans and two Europeans who were infected with *Trypanosoma gambiense* the Europeans and 26 of the Africans were examined in hospital with the slit lamp microscope and ophthalmoscope before during and after treatment while the remaining Africans were examined in their home surroundings with binocular loupe and ophthalmoscope after they had begun their treatment with antrypol (Germanin) and tryparsamide. The eye changes observed in the Africans are shown in the following table —

Type of Case	No	Keratitis	Irido cycl t s	Choroido retinit s	Optic atrophy
Hospital	26	9	4	nil	nil
Bush —					
With dilated pupils	43	8	1	nil	nil
Undilated	81	25	—	nil	nil
Total	150	42	7	nil	nil

Keratitis was mostly caused by trachoma only one case being attributable to trypanosomiasis in one European it appeared in one eye and healed after one injection of antrypol. Neither he nor the other European had increased aqueous flare or trypanosomes in the anterior chamber despite considerable numbers in the blood.

With regard to arsenical optic atrophy the author considers that Landolt's rings are preferable to the perimeter for testing acuity of vision as they make less demand on the patient's intelligence. In one patient who developed arsenical optic atrophy vision was normal after the sixth injection of 2 gm of tryparsamide slightly reduced after the seventh though the fundi were still normal but after the eighth injection it was reduced to 60 right and left with fundi still normal. Two months later the discs were pale and only light could be distinguished and after another month the patient had unmistakable optic atrophy. The author advises the testing of vision before each injection. The slightest diminution of acuity is an urgent sign that treatment must be stopped.

J. F. Coombs

FLAHE A. BOVET D. & MONTEZIN G. Sur quelques dérivés de l'éthylènediamin à action trypanocide. (The Trypanocidal Action of certain Derivatives of Ethylene Diamine.) *Ann. Inst. Pasteur* 1943 Nov-Dec 369 No 11-12 358-71

The first part of this paper is occupied by a description of the chemical preparation of the different compounds 39 in all. They were tested by injecting them subcutaneously or orally into mice infected with *T. brucei*. Eight compounds proved sufficiently active to produce a permanent cure in at least three-quarters of the treated mice.

2440 RP (*p*-ethylbenzylamino) 1 amino-2-ethane

$C_2H_5, C_6H_4, CH_2NH, CH_2CH_2NH_2$

1956 F (*p*-*n*-propylbenzylamino) 1 amino-2-ethane

191 F (*p*-isopropylbenzylamino) 1 amino-2-ethane

and the corresponding (*p*-sec-butylbenzylamino) 6 tetrhydro-menaphthylamino-1 isopropylmenaphthylamino-methyl 2 isopropylbenzylamino- and chloro-4 benzylamino-derivatives. The other compounds tested had slight or no activity. Compound 191 F the most active of the group was also shown to be equally active in guinea pigs infected with *T. brucei*. Activity seems to depend upon the presence of a diamine structure in the chain and on a second group C_2H_5 substituted in the benzene ring. On the other hand it is probable that the presence of a benzene nucleus is not essential for activity. These compounds form a new group of trypanocidal agents belonging to none of the previously known chemical types.

F. Harkin

MURAZ G. Un excellent test de la prophylaxie de la maladie du sommeil. Le pourcentage dans les collectivités des trypanos mé en 2^e période. Essai de médicaments nouveaux. Conditions d'une lutte effective. (An Excellent Test of Prophylactic Measures in Sleeping Sickness. The Percentage of Cases in the Second Stage.) *Bull. Soc. Path. Exot.* 1943 Nov 10 & Dec 8 36 Nos 11-12 33-6, 2 pl.

The relative proportions of the first and later stages of the disease among cases of sleeping sickness diagnosed for the first time is regarded

by the author as a good indication of the efficiency or otherwise of antecedent prophylactic measures. The division is made by examination of the cerebrospinal fluid patients with 0-5 cells per cmm being in the first stage those with 5-20 cells being classed as doubtful and those with more than 20 cells being in the second stage. If frequent inspections of total populations have been made early cases will have been diagnosed and cured if not these cases will have passed on into the later stages. Administrative and agronomic prophylactic measures are as important as medical ones.

The author gives figures for 31 sectors of the seven French colonies for the end of the year 1940 they show the total numbers of infected people total alive number cured deaths during the year index of total infection index of new infections and index of circulating virus (i.e. the proportion of people who have trypanosomes in the blood). Judged by the author's standard only four sectors indicated that the local prophylactic measures had been satisfactory two (*Koudougou Mossi* and *Dédougou*) are in the Upper Ivory Coast one (*Iabé*) is in Guinea and the fourth (*Haute Casamance*) is in Senegal.

Several factors contributed to produce these poor results shortage of medical staff shortage of transport facilities insufficient support and collaboration on the part of the Administration and sometimes a lack of enthusiasm on the part of the doctors. The author reiterates the need for frequent medical inspections and for the assembling of the whole of the village populations for these inspections this being the duty of the Administration.

During the three years 1939-1941 when the author was directing a special campaign against sleeping sickness in A.O.F. and Togoland much good work was done in spite of great difficulties resulting from the war and the armistice the most important result claimed is the reduction of the index of new infections from 2.11 per cent in 1938 to 0.74 per cent at the end of 1941. [See also this *Bulletin* 1942, v 39 744.]

In conclusion the requirements for a successful sleeping sickness campaign in the French colonies after the war are emphasized such a campaign would be a good investment yielding a big dividend.

A short description of the signs and symptoms of sleeping sickness is given together with the standard treatment and notes on three new drugs. The latter were named *Triarsenic acid* 4289 [this *Bulletin* 1941 v 38 634] *azoarsenic acid* 4196 and *arsenobenol* 4197 [this *Bulletin* 1942 v 39 444]. The first named 4289 is a colourless preparation of pentavalent arsenic it was given by mouth (daily) or by subcutaneous or intravenous injection (every three days) in doses of 0.03-0.05 gm per kgm (limit 3.0 gm). Six injections were followed by remarkably good results sterilization of the blood being rapid the results were less definite in the case of the two other preparations.

J. F. Corson

HERMOSILLA DIAZ F. AWAD S. & ROJAS M. Forma cardiaca de enfermedad de Chagas en un paciente Joven [The Cardiac Form of Chagas's Disease in an Adolescent] *Rev Med de Chile* 1943 Sept v 71 No 9 892-6 5 figs [31 refs]

FEBRILES OF THE TYPHUS GROUP

GIPOLD P. CIROLD M. L. & MEUNIER M. Méthode rapide permettant la séparation des rickettsies et de certaines bactéries des tissus où elles parasitent [A Rapid Method for separating Rickettsiae and certain Bacteria from Tissues] *C. R. Soc. Biol.* 1943 No. 137 No. 91/2° 703-4

Micro-organisms can be isolated from infected tissues by the method of fractional centrifugation but it takes a long time and the cellular debris is not at all completely got rid of. The authors have found the following method to be rapid and simple. For the separation of rickettsiae from infected rabbit lungs, the tissue is ground up and shaken for a few minutes with certain oils in given proportions: the cellular debris remains in the emulsion so-formed while the rickettsiae collect in the subjacent liquid. When a drop of this liquid is put on a slide the rickettsiae gather at the periphery of the drop and therefore are the more easily found. Paraffin oil, ground nut oil, oil of pine, oil of turpentine and doubly rectified terpinolene have been used. The method can also be used for the separation of other micro-organisms: acid fast bacilli and even non acid fast strains of acid fast bacilli always remain in the emulsions while other organisms, Gram positive or Gram negative are found like rickettsiae in the subjacent liquid. The method is useful for detecting small numbers of organisms in infected tissues.

J. F. Corson

BENGTSON Ida A. Complement Fixation in the Rickettsial Diseases—Technique of the Test. *Pub. Health Rep. Wash.* 1944 Mar 24 No. 59 No. 12 40°-3

The author gives a detailed account of the methods employed in her well known investigations into the complement fixation test as applied to murine typhus, European typhus, Rocky Mountain spotted fever and Q fever.

The technique is quite beyond the scope of any ordinary laboratory; it involves the availability of special skill and facilities as well as of the prolonged time needed for carrying out the tests.

The haemolytic system is of the usual type. The haemolysin is prepared from rabbits inoculated with washed red blood cells of sheep according to the technique of HOLMER or KILDUFFE. The complement consists of a pooled mixture of sera obtained from the heart blood of 10 to 15 guinea-pigs. The antiserum are prepared from rickettsiae cultivated by Cox's method.

Full details are given of the meticulously careful methods used in preparing and titrating the above reagents so as to avoid every possible source of error.

In carrying out the tests serum controls, antigen control and haemolytic system controls are set up and in addition to these standard serum controls are employed for each of which a pool is made of the sera of several animals which have recovered from the disease under investigation. Each set of pooled serum thus obtained is tested in the same dilutions as are used for the serum which is being tested.

This bald summary of the technique gives some idea of the conditions that must be fulfilled if the test is to be carried out in accordance with the high standard of accuracy observed by the author.

One simplification is mentioned as a possibility this is the use of the Cox type of vaccine as an antigen when dealing with European typhus fever

The original paper must be consulted by those who contemplate carrying out the test but now that the diagnostic value of the reaction has been established it is to be hoped that a simplified technique will be evolved

John W D Megaw

DYER R E The Rickettsial Diseases *J Amer Med Ass* 1944 Apr 22
v 124 No 17 1165-72

GEAR J DE MEILLON B & DAVIS D H S Typhus Fever in the
Transkei *South African Med J* 1944 Apr 22 v 18 No 8
144-8

[In a note by J F HERBST in the same number of the Journal it is stated that the Transkeian Territories lie in a corner between the Provinces of the Cape and Natal and are administered by a Chief Magistrate who governs by special proclamation There is a Health Officer but no registration of births and deaths The nutritional condition of the indigenous population has greatly deteriorated]

Typhus fever locally called black fever was first reported in a district of the territory by W and R L GIRDWOOD in 1909 but the officer responsible insisted that the disease was malignant influenza The disease has probably been endemic in the area for many years epidemics occurred in the periods 1917-22 and 1933-35

Since 1941 many thousands of cases have occurred and the present epidemic is the worst on record

The authors in a recent investigation have found evidence that flea borne typhus and tick borne typhus occur in the territory but the present epidemic is louse-borne The spread of infection is attributed to the custom of visiting sick friends and relations Under nourishment plays a part by causing an increase in the virulence of the infection

Inapparent attacks in children are also regarded as important factors in spreading the disease Europeans with the exception of doctors nurses and others who visit the sick are rarely attacked

It was at first believed that the reservoir of infection was in rats infected with murine Rickettsiae but investigation directed to the confirmation of this hypothesis has led to the contrary conclusion Several batches of rats and their fleas collected in the infected huts were found free from infection whereas lice collected from infected kraals yielded strains of typhus in 9 cases out of 10 Both head lice and body lice were found to be infected

The symptoms were of the usual type The incubation period was usually 10 to 14 days and seldom longer than three weeks The rash could seldom be detected on the dark skins of the Bantu patients In famine stricken communities most of the patients young and old died

Diagnosis was often impossible without the Weil Felix test Differentiation between the louse borne and flea borne infection could be effected by the Rickettsia agglutination test and by the complement-fixation test using the two types of Rickettsiae as antigens

In five cases a complete series of tests was carried out. The results are shown in the table.

Table showing the Titres Observed in Agglutination and Complement Fixation Tests

Case No.	Ox19	Ox	OxK	Agglutination		Complement Fixation	
				I.P.	A.P.	R.P.	A.R.
(1)	8400	5	0	1600	50	1600	00
(2)	100	5	50	1600	100	1600	400
(3)	1603			00	50	1600	400
(4)	800		50	100		400	50
(5)	1600	50	0	100	50	10400	1600

In other cases the *Ox19* titres were sometimes considerably higher than those shown above but usually they were much lower than the *Ox19* titre.

From the results of guinea pig inoculation the authors conclude that in general all the strains are similar and that they are typical strains of local born Rickettsiae. [This is an interesting observation in view of the opinion of some workers that the South African strains of *R. prowazekii* are different from those of other countries in their antigenic properties.]

A small amount of vaccine prepared by alum precipitation of a murine vaccine of the Castor type was tried in animal experiments and the results obtained in the field suggested that the method would be likely to have great value.

John W. D. Meade

TOPPING N. H. Typhus Fever. A Note on the Severity of the Disease among Unvaccinated and Vaccinated Laboratory Personnel at the National Institute of Health. *Am. J. Trop. Med.* 1944 Mar 1, 24 No 2 57-62 1 part

During the period 1929-1943 adequate observation were made in 14 cases of laboratory infection by typhus fever among the staff of the Typhus Unit of the National Institute of Health, U.S.A.

Seven of the patients had been vaccinated with yolk sac vaccine and these were unprotectd. The attacks in the latter group were typical and rather severe. The onset of the fever ranged from 14 to 20 days and the Weil-Felix titre rose to 1-640 or over in all the cases.

In six of the seven unvaccinated cases the fever lasted five to seven days. In the case in which it lasted twelve days the patient had been vaccinated about four and a half months previously with an early vaccine. In the vaccinated group the maximum Weil-Felix titre was much lower on the average. In one patient it was 1-40 in another 1-80 and in still another 1-160. In the other four cases it ranged from 1-320 to 1-1280. The titres were in striking contrast with those observed in the unvaccinated patients in four of whom they were 1-20480 or over.

The maximum complement fixation titres in the vaccinated ranged from 1-512 to 1-16384. This test was not carried out in the unvaccinated.

Both murine and classical strain of Rickettsiae were being used in the laboratory and as the organism was isolated in only one case in

which it was murine it was not possible to classify the cases according to the strain of infection

The virulence of the two strains in use remained constantly high through the whole period

In four of the seven vaccinated patients the diagnosis of typhus fever would not have been considered on purely clinical grounds the physicians in charge of the patients regarded them as suffering from sinusitis streptococcus throat grippe and pneumonitis respectively

In three of the vaccinated patients repeated attempts were made to isolate the Rickettsiae by guinea-pig inoculation and yolk sac cultures but without success These results suggested the possibility that vaccines may modify the infection to such a degree as to interrupt the louse man louse chain of transmission and so serve to control epidemics of the disease

John W D Megaw

SHUKOV VERESHNIKOV N N KOLODEZNAJA Z E ZALETAEV S G & IBRAZIMOVA N V [The Clinical Features of Typhus in Patients who were injected with the Vaccine of Krontovskaja] *Sovetskaya Meditsina* Moscow 1943 No 11/12 16-18 [In Russian]

An anti typhus vaccine for mass use has appeared only very recently but it has been already proved that patients injected with this vaccine develop a very much milder form of the disease None of the six vaccinated patients observed by the authors showed a petechial rash There is no negative phase in the post vaccination immunity The Weil Felix reaction seems to become positive slightly sooner in vaccinated patients who develop the disease The authors recommend that the vaccine of Krontovskaja be tried further during the incubation period and in persons who are likely to come in contact with typhus No statistics have so far been published but it is possible that the vaccine diminishes the risk of infection [No details of the preparation of the vaccine are given]

H W Swann

WOHRAB R & PATZER G Die Infektiosität geimpfter und ungeimpfter Flecktyphuskranker [The Infectivity of Vaccinated and Unvaccinated Typhus Patients] *Munch med Woch* 1944 Feb 11 v 91 No 5/6 57-9

In a series of carefully conducted experiments the authors found no evidence of infectivity in lice which had fed on patients suffering from laboratory infections with typhus fever they regard this negative finding as being due to previous inoculation with protective vaccines

The investigation dealt with 18 cases of laboratory infection in vaccinated persons and 26 control cases in unvaccinated persons whose infection was naturally acquired Although the two groups were not strictly comparable the authors believe that the laboratory infections were likely to have been more virulent than the others

Eight of the vaccinated patients had received specially intensive courses of Weigl's vaccine their attacks were mild except for one case of average severity the fever lasted 9.3 days on the average The other ten had been treated by standard doses of an egg yolk vaccine three of them had severe attacks the average duration was 11.4 days

Among the unvaccinated patients fourteen had severe attacks and the average duration of the fever was 14.5 days.

The *Proctosylla* and Rickettsia agglutination titres were lower in the vaccinated than in the unvaccinated. They were usually in proportion to the severity of the attacks and so were low in the Welsh vaccine group.

On each patient 200 clean laboratory bred lice of about 14 days old were fed for one half to one hour twice daily beginning as early as possible and continuing for 14 to 27 days. Smears were made from the faeces and guts of each batch of lice and as soon as Rickettsiae were found some of the lice were examined histologically. All the lice surviving at the end of the experiment were examined for Rickettsiae. Some of the attacks occurred in vaccinated persons who were engaged in providing blood feed for healthy lice. In their cases the same lice were allowed to continue to feed on them so that some of the experiments covered the incubation period as well as the febrile stage.

The findings were *Rickettsia proactis* was found in 18 of the 26 unvaccinated persons. The eight negative cases occurred in January and February 1943. In the positive cases only 20 to 30 per cent of the lice of each batch were infected. This low rate was probably due to the fact that feeding could not be maintained the second week of the fever.

Rickettsiae were first found in the tissue of the lice on the eighth day of feeding and in the faeces they began to appear 10 days later.

In the vaccinated patients the feeding of the lice began within the first three days. In most cases symptoms began during the incubation period. In only one case a few Rickettsia-like bodies were found in one of a lot of five lice examined on the eleventh day of feeding but these were not considered to be *R. proactis*.

It was therefore concluded that even the less effective yolk sac vaccine in use at the time was capable of preventing transmission of infection through lice.

On first infection this phenomenon also has occurred in patients who had been vaccinated by Welsh's method. It did not become significant in the negative results recorded. There occurred no further attacks in vaccinated persons.

Vaccination may therefore turn out to be an effective means of controlling epidemic typhus but the present methods are unsuitable for the adoption of this method of prevention.

John W. D. Megaw

BUNLFF F. Zur Behandlung des Fleckfiebers mit Konvaleszentenblut (The Treatment of Typhus Fever with Convalescent Blood) *Munch med Woch* 1944 Jan 14: 91 No 1/2: 5

The author's experimental expressions of the effects of convalescent blood in the treatment of typhus fever.

In 1941-42 he observed a distinct improvement after treatment with convalescent blood in the condition of four patients who were suffering from severe attacks and in 1942-43 he used the treatment when convalescent blood was available from patients whose blood groups were suitable but in the doses of 100 to 250 cc. The average dose of 50 cc on each of 4 days at intervals of one or two days.

The donors selected were young otherwise healthy persons whose deferment had occurred not more than 14 days beforehand and who

had not shown severe nerve or circulatory disturbances during the attack

In all cases a distinct improvement was observed especially in the headache and *pathy* but the sudden and lasting benefit reported by HOER & LOBENSTEIN [*Munch med Woch* 1943 v 90 No 7] was not obtained. The author agrees with this worker when he insists that the treatment is specially useful in the early stages of the fever

Symptomatic treatment by strophanthin and sympatol is essential the latter drug is of special value it is given in doses of 20 minims four times daily from the outset [Sympathol (synephrine) is a synthetic drug with an action like that of adrenaline]

The author states that when he mentions a fall in the lethality rate among his patients from 15 per cent in 1941-42 to only 2 per cent in 1942-43 this must not be taken as implying that he regards the improvement as being due to the use of convalescent blood

John W D Megaw

DAVIS W A & WHEELER C M The Use of Insecticides on Men artificially infested with Body Lice *Amer J Hyg* 1944 Mar v 39 No 2 163-76 1 fig

As part of a programme for the control of typhus fever the delousing of men by powders and sprays was studied. Pacifist volunteers working at a road construction camp were infested with body lice observed till their infestation was increasing and then treated. The men wore uniform sets of underwear which was not washed or changed for three weeks. They were infested from a laboratory stock of lice by sewing on a patch of cloth carrying 100 lice as well as eggs at the back of the pants. Counts were made at two-day intervals the average numbers fell and then rose to about 30-50 by the end of a week when the treatments were applied

Each powder tested was applied to the clothes of five men using 30 gm each. The numbers of lice usually dropped suddenly but with the exception of a few very effective powders began to increase again as more lice hatched from eggs. Powders with pyrethrins 2.4 dinitro-6-cyclo hexyl phenol and 2.4 dinitro anisole were most effective [As almost all the powders were mixtures the relative effectiveness of the several ingredients was not clear]. The most effective mixtures seem to be the following. No 153 consisting of 0.6 per cent 2.4 dinitro 6 cyclo-hexyl phenol 0.1 per cent pyrethrins and 0.5 per cent n iso butyl undecylenamide in pyrophyllite dust and MYL [first adopted as the U.S. Army louse powder but later superseded] it contained pyrethrins 0.2 per cent, isobutyl undecylenamide 2 per cent phenol 5 per cent anti oxidant and 2.4 dinitroanisole 2 per cent in pyrophyllite. See this *Bulletin* 1943 v 40 899]

Some tests were made with a spray containing 0.2 per cent pyrethrins and 20 per cent phenyl cellosolve in acetone. About 50 cc was used taking only a few minutes to apply. Results were moderately good

No skin irritation was caused by any of the compounds mentioned in this abstract but the 2.4 dinitro 6 cyclo-hexyl phenol caused bright yellow staining of skin and garments

J R Busvine

DAVIS W A J VERA F M & LIRA P H
 in a Civilian Population 4m r J H
 177-88

Studies on Louse Control
 1944 Mar v 39 No 2

The paper describes the development of an administrative technique for the flea-killing agents on civilian populations in Mexico. The ultimate aim of the work was to control typhus fever the most important purpose was to rid an entire town of lice cheaply, rapidly and in minimum of equipment. First the co-operation of the people to be treated as well as the prestige of uniformed workers from the Mexican Health Department contact with influential citizens explained the public meeting service of a clinician who dealt with miscellaneous diseases encountered present of soap etc). Then the cells were mapped and a complete census taken. Teams of two preferably a man and a woman went round examining the head and anything of every person if possible. Brief record were made of the state of lousiness and both head and clothing were treated. The head was washed with the following lotion using about 8 cc for a man and considerably more for a woman.

Phenyl cell sol
 Ethanol
 Water
 Methyl alcohol

1 part
 parts
 parts
 100 parts

For the clothing, about 25 gm of fine powder are applied mainly to the inner side of the garment next the skin. Flexible transparent tubes with a hole one end for puffing out powder are useful. Three types of powder were used the formula of the most successful not being disclosed. It is believed to be pyrethrins 0.2 per cent 150 bu undecylenamide per cent phenol 5.1 per cent dinitroaniline 2 per cent. About 10 hours with 50 people were treated each day each team.

A final examination was made after a week and a final examination after a month. The trials were done in five small Mexican villages. In one of these trials a epidemic and 64 per cent of the population had body lice. Following treatment the epidemic disappeared and the number of lousy people in the second week was negligible. A month after the first treatment only 7 per cent of the population had lice. J R Busine

IRIST R & BOURGAIN M E. La transmission expérimentale du typhus murin par les déjections d'*Ornithodoros erraticus*. Failure to transmit Murine Typhus by Tissue Suspensions and Faeces of *Ornithodoros erraticus*. Bull Soc Path Exot 1943 No 10 & Dec 8 34 11-12 396-30

The authors found evidence that *Rickettsiae* of murine typhus are not transmitted to the body of *Ornithodoros erraticus* and therefore concluded that the tick are unlikely to play an part in the transmission of murine or epidemic typhus. The experiments conducted in feeding a number of healthy pre-adult nymphal ticks on three guinea pigs infected with the I.F.X. Toulon strain of murine *Rickettsia*. The feeds were on the first, second and fourth days of the febrile reaction. Pooled supernatant of the ticks tested by intraperitoneal inoculation of four healthy guinea pigs but the animals failed to cause infection whether they were made

immediately after the feeds or at intervals of 7-33 or 63 days. In all cases the guineapigs used were later found to be susceptible to the same strain of *Rickettsiae*.

Faeces of ticks which had fed in the same way were collected 10 and 155 days afterwards. They failed to cause an immunizing infection in any of the guineapigs which were inoculated with them though in some cases there were irregular rises of temperature.

John W. D. Megaw

AHLM C. E. & LIPSHUTZ J. Tsutsugamushi Fever in the Southwest Pacific Theater. *J. Amer. Med. Ass.* 1944 Apr 15, 124 No 16 1095-100 3 figs [Refs in footnotes]

Tsutsugamushi fever (dangerous bug fever) has also been called by such names as Sumatran typhus, K. typhus, scrub typhus, kedani disease and pseudo-typhoid fever of Deli.

The report deals with 70 cases, most of which occurred among troops engaged in clearing a densely wooded area of half a square mile. The rainfall of the area is heavy, rodents and their mites are abundant. Localities with scrub and dense damp jungle were most heavily infected. The occurrence of the cases was of the endemic type.

Species of *Trombicula* mites were found on the ears and genitals of field rats and mice in the affected area.

Some of the clinical features were: The primary ulcer was found on the scrotum (16 cases), the ankle (10 cases), the inguinal region (9 cases) and the thigh (8 cases). In 23 cases no ulcer appears to have been found. In nearly all the patients there was adenitis of the inguinal region, this appeared three or four days after the onset.

The temperature rose steadily, reaching 104 to 105 F after 10 days. About the seventh or eighth day a macular erythema appeared on the face, chest and abdomen. In six cases there was no rash and in four it was slight.

In about 67 per cent of the cases there were severe atypical signs of pneumonia with dry cough, scanty sputum and dyspnoea. In 20 per cent a virus-like pneumonia was revealed by X-ray examination.

Abdominal distension with nausea and vomiting occurred in 60 per cent of the cases. The temperature fell by lysis and convalescence was slow, the average period of incapacitation being not less than 100 days. Only one of the patients died.

The leucocyte picture gave little help in diagnosis, the total count ranged from 1400 to 14250, it exceeded 9000 in only 4 of the 55 cases in which the data were available. An appreciable number of the patients had leucopenia with relative lymphocytosis.

The *Proteus* OXA reaction became positive about the second week. From the table it appears to have been negative in 5 of the 59 cases tested and the titre was 1-40 or 1-80 in 16 cases. In most of the others it rose to 1-640 or over. Nearly all the patients whose titres were low had no primary ulcer.

The general features of the disease appear to have conformed to the typhus pattern.

The authors' views on treatment are conservative. Convalescent serum was regarded as risky. Sulphonamides were found ineffective in the cases with pneumonic signs. Plenty of fluids by the mouth, fruit juices, sodium chloride tablets, vitamin B complex and multivitamin

tablets were found useful. Sedatives and encouragement, suggestion were valuable in allaying anxiety and restlessness.

The author points out that the disease constitutes a serious military problem because of the prolonged incapacitation that it causes and also because there may be a high rate of mortality.

Suggestions for prevention include the use of indigenous labour for clearing and burning grass and vegetation on sites that are to be used as camps, a rotation of sleeping on the ground, spraying camping grounds with petroleum emulsion and dusting the body with equal parts of sublimed sulphur and talcum.

The report confirms the view held by British and Australian military medical officers that mite-borne typhus is a major military problem in the East.

Throughout the Pacific region and the south-eastern area of Asia including India and Ceylon an attitude of watchful suspicion is essential when troops are operating in scrub jungle and open country.

Although the disease ordinarily occurs in sporadic form there may be large outbreaks among troops entering areas of intense infection and a serious degree of incapacitation of the personnel is a possibility.]

John W. D. Meade

BARTONELLOSIS

JARAMILLO J. R. Contribucion al estudio de la Bartonellosis en Colombia (Enfermedad de Carrion) (Bartonellosis in Colombia) *Medica* Bogotá 1943 June 5 No 34 158-82

The author has studied a disease rife in Sandona, Narino Department, one that might be typhoid fever but which he holds a Carrion disease. The present article is based on a study of 200 cases. The outbreak first appeared in a rural area of the Department in 1943 and later spread to other districts particularly the valleys of the Guatir, Juanamba and Mayoris rivers. The author describes the form Orova fever and Verruga peruana. The prognosis in the former is 35-40 per cent, the latter the author finds to hold good for cases in the local hospital. He then gives details of 10 patients, five died the rest recovered. In one of the latter the red cells were as low as 500,000 per cmm with *B. bacillera* in the erythrocytes. Improvement was noted immediately after a blood transfusion. Pain vomiting and diarrhoea ceased and *Bartonella* were hard to find. A second transfusion as given three days later and cure followed rapidly. Previous injection of acridine and campolon had done no good at all.

Thirteen cases of the verruga form are also described. All recovered. Injection of Fouad in doses of 15 to 20 cc intramuscularly or intradermally benefited some but the best results were obtained with intravenous injections of cyanide of mercury 0.01 gm on alternate days for five or six injections and none or two more after an interval of ten days. In former papers 0.01 cgm sometimes means 0.01 gm not 0.1 gm. The author implies that the latter it means 0.0001 gm is not correct as this mode of preparation is not described nor the solvent used. In all but the first instances 0.01 cgm is mentioned in the two except on the dose stated as 0.10 cgm.

H. Harold Scott

YELLOW FEVER

BATES M & WEIR J M The Adaptation of a Cane Rat (*Zygodontomys*) to the Laboratory and its Susceptibility to the Virus of Yellow Fever *Amer J Trop Med* 1944 Jan v 24 No 1 35-7

The authors have been successful in establishing a breeding colony of 50 female and 30 male cane rats *Zygodontomys microlinus* near *stellae* Thomas from which they get 50 to 80 young per month. The gestation period of this species is about 28 days they reach sexual maturity in three to four months and the average litter is about four.

Attempts were made to infect this species with yellow fever virus using two local (Colombian) strains and also a neurotropic strain. Subcutaneous and intraperitoneal inoculations into 14 cane rats produced no signs of infection and attempts to recover virus at intervals between four and seven days after the inoculation were all negative. The virus seems to grow readily in brain tissue after intracerebral inoculation but only about half the animals died of the infection. The French neurotropic strain was carried through 12 intracerebral passages in these animals and showed some signs of adaptation since the mortality became higher and the incubation period shorter.

Protection tests with the blood of animals that had been inoculated either subcutaneously or intraperitoneally showed that circulating antibodies were developed as well as after intracerebral inoculation.

E Hindle

LAFMERT H W Jr Susceptibility of Marmosets to Different Strains of Yellow Fever Virus *Amer J Trop Med* 1944 Mar v 24 No 2 71-81 1 fig [11 refs]

The author has studied the susceptibility to various strains of yellow fever virus of three species of marmosets *Callithrix leucocephala* (E Geoff) *C jacchus* (L) and *Leontocebus rosalia* (L). The virus employed included two African strains the Asibi and French and seven South American strains. All the marmosets were inoculated subcutaneously with infective monkey serum and the number of MLDs were estimated by intracerebral tests in white mice.

In the case of *Callithrix jacchus* (L) 172 animals were tested and the mortality with different strains of yellow fever virus is shown in the table on page 748.

Somewhat similar results were obtained with 30 *Leontocebus rosalia* inoculated with two African and two South American strains. In these two species inoculation with the Asibi or French strains was not in general fatal but the virus circulated in the blood and neutralizing antibodies developed. Most of the South American jungle strains however were highly lethal for these species.

On the other hand in the case of 22 *Callithrix leucocephala* similarly tested fatal infections were produced not only by the jungle strains but also by the Asibi strain the only African strain tested. The average survival time of animals infected with the Asibi strain was seven days whilst five inoculated with jungle strains died on the fourth to the sixth days of infection. In all cases circulating virus was present generally appearing within 24 to 48 hours and persisting until death.

Tropical Diseases

Mortality of Callithrix haustori in the field											
Number of Mammals	Sex	Numb P h	Rag (MID f ru l t d	Dead		Survived		Numb P d th	Mortality		
				by ill		by					
				a	b	a	b				
10	a b	39 t 43	1 x 10 t 11 x 10	0	8	13	1	3	0/1 (0 p)		
16	a t	17	10 t t x 10	3	56	1	11	1	3/14 (21 p c)		
	i h	± 17	x 11 t 15 x 10	5	60	14	13	3	5/18 (8 p c)		
	J Z	3 t 5	1 x 10 t 7 x 10	0	75	3	2	0	0/ (91 p c)		
18	O C	1 t 5	3 x 10 t 1 x 10	7	81	5	2	0	15/17 (88 p)		
15	J F	11	x 10 t 1 x 10	9	90	3	5	3	7/11 (58 p)		
1	M A J	1	12 x 10 t 1 x 10	11	70	3	3	0	9/11 (75 p c)		
14	A C B 1	1	48 x 10 t 48 x 10	3	93	1	1	5	11/11 (92 p)		
13	M r t	3	35 x 10 t 5 x 10	3	66	5	5	5	3/8 (38 p)		

$\Delta ST = A \text{ e ag } r \text{ ltm}$

AST = A c a g r l t m

Specific gross and microscopical lesions were found in all three species after fatal infection with the virus. The degree of liver necrosis varied from one case to another but in *L. rosalia* nearly 40 per cent showed a greater concentration in the mid zone whereas in the other two species the necrosis was evenly distributed throughout the lobule and it was exceptional to find any marked mid zonal necrosis. Intranuclear inclusion bodies were found in the livers of *C. jacchus* infected with certain jungle strains although as a rule these strains do not produce such bodies in *rhesus* monkeys.

Marmosets which survived infection with any of the African or South American strains developed a humoral immunity.

E Hindle

BATES M. The Saimiri Monkey as an Experimental Host for the Virus of Yellow Fever. *Amer J Trop Med* 1944 Mar v 24 No 2 83-9 2 figs

A total of 19 squirrel monkeys *Saimiri sciureus caquetensis* Allen collected in the neighbourhood of Villavicencio where this animal is very common were infected with various strains of yellow fever virus either by direct inoculation or by means of infected mosquitoes *Haemagogus capricornis*.

With one doubtful exception in all cases virus was recovered from the circulation the maximum titre ranging from 1:100 000 up to more than 1:1 000 000.

In a series of 14 infections mainly with a local strain the Nova virus but including other strains five died within 10 days under circumstances suggesting that the virus was the cause of death. It is of interest however that this species can be infected by doses of virus too small to be detected by the usual method of intracerebral inoculation into white mice. Although fatal infections show some pathological changes in the liver in only one case were they characteristic of yellow fever. Antibody production may be very weak corresponding to a dilution of 1:64 of immune rhesus serum but there is no evidence of false positive reactions.

The author gives some notes on the taxonomy and habits of *Saimiri* monkeys and discusses the possibilities of their use for the laboratory study of yellow fever. The main objections are their small size the toxicity of their serum for white mice the uncertainty of working with animals that may have been exposed to natural infection and also the high degree of helminth parasitism. Almost all wild specimens were found to be infected with an *Acanthocephalid* worm *Prosthenorchis elegans* nematodes probably *Filaroides* sp. were nearly always present in the lungs and another nematode *Dipetalonema gracile* is sometimes found in the peritoneal cavity in addition a trematode *Athesmia foxi* is frequently found in the liver.

E Hindle

BATES M. Experiments with the Virus of Yellow Fever in Marsupials with special reference to Brown and Grey Masked Opossums. *Amer J Trop Med* 1944 Mar v 24 No 2 91-103 3 figs & 1 diagram [13 refs]

The author has extended the study by BUCHER *et al* [see this *Bulletin* 1941 v 38 434] on the susceptibility of marsupials to yellow fever virus.

The taxonomic of these opossums is a matter of some difficulty and photographs of three of the common species are given. These include the Grey Masked Opossum *Metachiroptus ossim* Allen, the Brown Masked Opossum *Metachiroptus nudicaudatus* Allen, and the Woolly Opossum *Caluromys laniger* Bangs. In the paper by Bugher *et al* referred to above *Metachiroptus* called *Phylander* whilst in a previous paper by Blaxter (1940) the name *Plisander* is used for *Caluromys*.

The results of a Colombian (No. 22) strain of yellow fever virus maintained in the Brown Masked Opossum *Metachiroptus* for 10 consecutive passages by intramuscular inoculation of serum. Since the animals showed no obvious sign of infection they were bled uniformly on the fifth day of passage. Since other tests had shown that virus is most often circulating on this day. The virus content of the serum used for inoculation was estimated by means of protection tests in white mice. There was no apparent increase in virulence or infectivity for the Brown Masked Opossum or for the Grey Masked Opossum in the course of these passages. The virus seemed equally infectious for squirrel monkey both before and after the serial passages.

Variation other strains of yellow fever virus were inoculated into the Brown Masked Opossum and circulating virus was recovered from 34 out of 47 animals.

The closely related Grey Masked Opossum *Metachiroptus* gave very different results and circulating virus was recovered from only one of 25 animals inoculated or included in Bugher's experiments 4 out of 43 animals.

Brown Masked Opossums which failed to show circulating virus after inoculation were sometimes positive after a second inoculation of the same or different strain. Antibody response as measured by the intracerebral protection test is usually regular in this species but a few animals seemed to give false reactions and others failed to show any response even after circulating virus had been present.

The results of intracerebral protection tests with the sera of the Grey Masked Opossum seemed to bear no relation to any exposure of the animal to yellow fever virus but the serum was highly toxic for mice intracerebrally killing about 40 per cent. The serum of the Brown Masked Opossum does not show this toxic property.

From these experiments it is difficult to form any opinion as to the importance of these marsupials in the epidemiology of jungle yellow fever. The amount of virus in circulation rarely exceeded a titre of 1:1000 whilst in transmission experiments with *Hæmaphysalis* fed on squirrel monkeys a minimum titre of 1:100,000 was necessary for the infection of the mosquito.

E. H. Hille

TURNER R. H. SNARELY J. R. GROSSMAN E. B. BUCHANAN R. V. & FOSTER S. O. Some Clinical Studies of Acute Hepatitis occurring in Soldiers after Inoculation with Yellow Fever Vaccine with especial consideration of Severe Attacks. *Ann. Intern. Med.* 1944 Feb. 1, 20 No. 2 193-215. 21 refs.

The authors had the opportunity of studying 4683 cases of hepatitis following the inoculation of icterogenic yellow fever vaccine in US Army personnel with *Bulletin* 1943 1, 40-40.

The cases all occurred within a period of four months and the period between inoculation and onset of the disease was 9 to 23 weeks. About half occurred during the fourth month after inoculation.

The clinical picture and laboratory findings were on the whole similar to those described by others in patients receiving icterogenic yellow fever vaccine or icterogenic human serum. The authors classed as severe those cases in which the attacks lasted more than 50 days with icterus indices reaching 120 or higher and in some instances a marked loss of weight. These comprised about 2 per cent of all cases. Petechial haemorrhages and anaemia usually microcytic occurred in most of the severe cases. There were 14 fatal cases among the 4 083 a slightly higher percentage than usually found. All the patients who died had evidence of dysfunction of the nervous system before death. The authors observed four subjects who showed during convalescence or after apparent recovery a slow coarse tremor of the extremities they suggest that the tremor has the same cause as that seen in the syndrome of hepatolenticular degeneration. Ascites was seen in 13 patients. Five of these died and eight apparently recovered.

In making a prognosis it was found that the rate of correction of prolonged prothrombin clotting after vitamin K therapy was the best single guide. Daily examination of morning specimens of urine meal by meal check of the kind and amount of food taken (anorexia subject to diurnal variations is regarded as the most important symptom of the disease) and daily records of body weight were found highly useful in the early detection of changes in the course of the disease. The importance of sufficient rest during the illness and convalescence is stressed. The routine diet used was high in carbohydrate and protein and low in fat. The authors consider that regularity and frequency of food intake are probably of greater importance than exactness of the composition of the diet. Vitamin supplements did not seem to influence recovery. Group studies failed to show beneficial effects from the use of methionine and choline.

F O MacCallum

SOPER Fred L WILSON D Bruce LIMA Servulo & ANTUNES Waldemar Sá The Organization of Permanent Nation-Wide Anti *Aedes aegypti* Measures in Brazil

This book was reviewed on p 699

DENGUE

KISNER P & LISANSKY E T Analysis of an Epidemic of Dengue Fever *Ann Intern Med* 1944 Jan v 20 No 1 41-51

The authors give an analysis of the signs and symptoms of 318 cases of dengue fever in the army personnel of a coastal town in an island in the South Pacific area during March and April 1943.

The incidence of the chief features was as follows: the figures in brackets refer to percentages. Sudden onset (93.7) chilliness (31.8) flushed face and reddened eyes (26) definite rash variable in time and site of appearance but usually a blotchy erythema most pronounced on the chest (37) saddle back fever curve including cases with a period of normal temperature between the two spells of fever (66) one-phase fever curve (29.5) various aches and pains (99) including frontal headache (69) backache (43.5) and pain in or behind the eyeball (25) relative bradycardia after the first day or two (97) adenopathy

Among the special clinical features of the attacks the following are of interest Lymphadenopathy especially of the posterior cervical glands occurred in 90 per cent conjunctivitis in 75 per cent pharyngeal lymphoid hyperplasia in 65 per cent palpable spleen in 25 per cent and a rash in 40 per cent of the cases

John W D Meaw

PLAGUE

JAWETZ E & MEYER K F The Behaviour of Virulent and Avirulent *P. pestis* in Normal and Immune Experimental Animals *J Infect Dis* 1944 Jan Feb v 74 No 1 1-13 1 chart [16 refs]

Strong support has been forthcoming for vaccines of living avirulent organisms rather than of dead organisms But it is not every virulent organism which is at the same time immunogenic This character has indeed to be proven before the organism in question can be successfully used Live plague vaccines have now been used on a large scale With elaboration of a sensitive technique a comparison has been instituted by the authors of the behaviour of virulent and avirulent *P. pestis* respectively after subcutaneous or intracutaneous inoculation in mice guineapigs and rats The distribution of the two types of organism does not differ except quantitatively Avirulent strains however as has been frequently described may differ in their power of producing immunity according to the test animals It is argued that as these avirulent strains are still distributed equally and persist for the same length of time in the different host animals the immunogenic activity cannot be correlated with invasiveness or survival in the body and must be dependent on antigenic constitution In actively immunized guineapigs and mice the distribution of inoculated virulent organisms was found to be much the same as in non immunized animals but the bacilli disappear in due course from the former and in the following order blood stream liver and spleen regional lymph nodes and local lesions On the other hand proliferation not disappearance took place in non immunized animals Another similarity found to exist between the behaviour of virulent and avirulent bacilli was that the cumulative mortality curve obtained with a small subcutaneous dose of the former resembled that with a large toxic dose of the latter Survival in the body of avirulent organisms appeared to be longer in the brain tissue of mice after intracerebral injection than if administered in any other way The pathological lesions produced by virulent and avirulent organisms are also contrasted

W F Harvey

McMAHON Margaret C Susceptibility of the Golden Hamster *Mesocricetus auratus* to Plague *Pub Health Rep* Wash 1944 Feb 18 v 59 No 7 234-6

Natural infection of the hamster (*Cricetus cricetus*) was reported in south eastern Russia in 1926 and artificial infection only of three

species *Cricetus barabensis* *giseus* *Cricetulus barabensis barabensis* and *Cricetus barabensis*. Apparently trials of susceptibility have not been made with the Syrian hamster (*Mesocricetus auratus*) and this is the best suitable by the author. The inoculations of the hamsters were all intraperitoneal or intraperitoneal in doses of two million to three billion 3000 million organisms with appropriate mice and guinea pigs. All animals were autopsied. Of 12 mice inoculated 11 died. Twenty nine out of 30 guinea pigs died of plague. Of 15 of the 48 hamsters used. Serological tests and protection trials were also carried out with the surviving hamsters. These results indicate that the golden hamster is not a suitable animal for the use as a test in the diagnosis of plague. It is highly resistant to plague infection when compared with other test animals but does not exhibit a natural immunity as determined by serological methods. H. F. HARRIS.

BACILLARY DYSENTERY

JAMIE ON W. M. BRODIE J. A. STILAN D. Bacillary Dysentery in Dundee. A Comparative Study of Treatments. *Brit Med J* 1944 Mar 4 3rd 4.

The value of sulphaguanidine in obtaining clinical and bacteriological cure in bacillary dysentery was assessed by comparison with saline aperients and a chalk mixture in a total of 200 cases (100 treated with sulphaguanidine, 50 with saline aperients and 50 with chalk mixture). Most of the cases were children under 12 years of age. The infecting organism was *Bacillus flexneri* or the newcastle variant in 75 per cent, *Bacillus sonnei* in 10 per cent and mixed in 15 per cent. And the infection was not as a rule severe 47 per cent having blood and mucus in the stools. Dose of sulphaguanidine based on age varied from 14 to 67 gm over five days. Quantitative estimation of the drug in faeces showed levels varying from 400 to 13 000 mgm per cent. The average duration of symptom, that is until stools became normal, was 5.0 days for sulphaguanidine, 6.0 for chalk and 6.5 for aperients. Bacteriological cure was based on three consecutive negative faecal cultures from the first patient became clinically well during the period of treatment. Of the bacillary dysentery treated by BRODIE see *Brit Med J* 1943 1 155. Of the bacillary dysentery treated by the three cases had a 0 per cent cure rate with 50 per cent for aperients and 48 per cent for chalk. The results with the sulphaguanidine series were better in the *Bacillus flexneri* and *Bacillus sonnei* than in the *Sonnei* infection. Of the total positive count in convalescence 36 per cent were positive only after treatment in faeces both medium while in the sulphaguanidine series 46.6 per cent of the positive result occurred within the first 24 hours. Thus (directly) only had been used the convalescent carrier rate in the sulphaguanidine series would have been 19 per cent compared with 28 per cent and 46 per cent in the aperients and

chalk series respectively. A comparison was not made of the duration of the carrier state associated with the different treatments.

Robert Cruickshank

1 SCADDING J G Comparative Effects of Sulphonamide Drugs in Mild Bacillary Dysentery *Lancet* 1944 June 17 784-6

11 BOYD J S K Bacillary Dysentery [Correspondence] *Ibid* July 15 90

1 The author investigated the relative efficacy of sulphaguanidine, sulphapyridine and sulphanilamide in the treatment of 358 mild cases of dysentery admitted to a desert base hospital in the Middle East during the summer of 1943. It was not considered justifiable to leave any cases untreated to serve as controls. New admissions to the hospital were treated in rotation with one of the three drugs for a period of 48 hours, the following dosage being used: sulphaguanidine 7.5 gm followed by 2.5 gm three hourly; sulphapyridine 3 gm followed by 1 gm three hourly; sulphanilamide 3 gm followed by 1 gm three-hourly. The total doses given during the 48 hours were 47.5 gm, 19 gm and 19 gm respectively.

Cultures were made from 34 patients' dysentery bacilli being isolated from 16; the varieties were Shiga 6, Sonne 4, Flexner 3 and unidentified 3.

It happened that the drugs were not given in strict rotation and so more patients received sulphaguanidine than either of the other two drugs. The data, including criteria of clinical severity and of the results of treatment, are shown in the table on p. 756.

Conclusions—The three sulphonamide drugs are equally beneficial in mild bacillary dysentery. sulphaguanidine has the advantage of great freedom from unpleasant side effects while sulphapyridine is liable to cause serious renal disorder.

11 The author opposes the view expressed by Scadding and in other recent articles on the treatment of bacillary dysentery that the disease in the Middle East is now of a mild type. If that view were accepted it might give the impression that the efficiency of treatment by sulphonamides had not been clearly shown and that cases would probably have recovered equally well without it. Those doctors who had to treat the disease in the Middle East before sulphonamides were available saw a proportion of severe cases, many of the patients remaining incapacitated for a long time and some dying in spite of receiving every form of treatment then known. Such severe cases were common in the Middle East Force in the latter part of 1940. When sulphaguanidine was received (towards the end of 1940) it was tried out first on subacute cases of long standing which had resisted all treatment. The results were dramatically successful in these cases and in other types of case and from that time onwards dysentery lost its terrors: when a sufficient supply of the drug became available the grave type of the disease was rarely seen.

The author thinks that the mildness of Scadding's cases was due to early treatment with sulphonamides and not to a change in virulence of the infecting organism. 18.86 per cent of dysentery bacilli identified during three years in the Middle East were *B. dysenteriae* Shiga.

J F C

	Group 1		Group 2		Group 3		Group 4	
	1944	1945	1944	1945	1944	1945	1944	1945
1	11	11	11	11	11	11	11	11
2	11	11	11	11	11	11	11	11
3	11	11	11	11	11	11	11	11
4	11	11	11	11	11	11	11	11
5	11	11	11	11	11	11	11	11
6	11	11	11	11	11	11	11	11
7	11	11	11	11	11	11	11	11
8	11	11	11	11	11	11	11	11
9	11	11	11	11	11	11	11	11
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13	11	11	11	11	11	11	11	11
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90	11	11	11	11	11	11	11	11
91	11	11	11	11	11	11	11	11
92	11	11	11	11	11	11	11	11
93	11	11	11	11	11	11	11	11
94	11	11	11	11	11	11	11	11
95	11	11	11	11	11	11	11	11
96	11	11	11	11	11	11	11	11
97	11	11	11	11	11	11	11	11
98	11	11	11	11	11	11	11	11
99	11	11	11	11	11	11	11	11
100	11	11	11	11	11	11	11	11

Back to
an 80 per cent. of polymorphous clear
C. A. 100 per cent. of polymorphous clear

It was considered unjustified to withhold the drug from patients for the purpose of making controlled experiments but the mildness of the disease demonstrates the efficiency of sulphonamide treatment

J F Corson

In vitro tests were made with citrated and heparinized rat blood containing numerous spirochaetes to which 10 per cent sodium penicillin in saline solution was added. Concentrations of 0.1, 1, 10 and 100 Oxford units of penicillin per cc. caused no visible decrease in motility of the spirochaetes kept at room temperature up to seven hours.

In vivo tests were made with white mice inoculated intraperitoneally with a large dose of *S. novyi* and treatment with penicillin was started 22 hours after the inoculation and continued for 4 days. Subcutaneous injections each of 125 Oxford units of sodium penicillin in solution were administered four times during the daytime and an additional dose of 500 units of powdered sodium penicillin in sesame oil was given at 9 p.m. to last through the night. Of 26 mice treated in this way only one died and the cause of death was unknown whilst of 28 untreated controls 21 died of spirochaetosis. Of the seven which lived all showed relapses whilst of the 25 treated mice which lived only four had a relapse. In this study relatively large doses of penicillin were used but the infections were overwhelming; it seems probable that smaller doses would be effective in the treatment of relapsing fever if the inoculum was less virulent. E Hindle

AUGUSTINE D. L. WEINMAN D. & McALLISTER Joan. Rapid and Sterilizing Effect of Penicillin Sodium in Experimental Relapsing Fever Infections and its Ineffectiveness in the Treatment of Trypanosomiasis (*Trypanosoma lewisi*) and Toxoplasmosis. *Science* 1944 Jan 7 19-20.

A preliminary report dealing with the results obtained with penicillin sodium therapy in the following experimental infections: (1) *Trypanosoma lewisi* in laboratory rats; (2) *Toxoplasma* in mice; and (3) *Spirochaeta novyi* in mice.

Six rats were infected with *T. lewisi*; four treated each with a total dose of 32,000 Oxford units of penicillin (2,000 units 3 hourly) and two were kept as controls. No significant difference was noted in the number of trypanosomes in treated and untreated animals.

Sixteen mice were infected by the intraperitoneal inoculation of *Toxoplasma* highly pathogenic for mice and half of them were treated with total doses ranging from 6,500 to 9,000 units. The treated mice died after the same interval as the infected untreated controls.

In the case of relapsing fever (a strain of *S. novyi*) eleven mice were infected and after 24 hours six mice were treated intraperitoneally each by 1,000 units for a first dose and then 500 units every three hours for 48 hours. After 27 hours spirochaetes had disappeared from the blood of all treated mice whilst the five controls were all heavily infected. The blood of two of the treated mice 60 hours after treatment was subinoculated intraperitoneally into two normal mice which remained uninfected.

In a second experiment a relapsing fever mouse after receiving 4,000 units in 19 hours was found to be a carrier although no spirochaetes were seen by direct examination. E Hindle

LEPROSY

IBARRA FIEREZ R & GONZALEZ PRENDES M A Incidencia de la lepra según la edad [Age Incidence of Leprosy (in Havana)] *Rev L pro a Dermatologia y Sifilografía* Marianao Cuba 1944
Apr 1 \ 5-14 [90 refs]

Most authorities are agreed that the symptoms of leprosy often make their appearance about the time of puberty and ascribe this to the biological change of that period the increased bodily activity and in part also to general lowering of defence by malnutrition intestinal prostration and promiscuity of life in the healthy occupying not only the hospital but also the same room and even the same bed as the sick. The authors study is based on 611 cases at the San Lazaro Hospital. Havana. By a percentage incidence the authors mean the age at which the patient first noticed any sign or that at which close quest on his life revealed any such. One hundred (16.4 per cent) came within the 11-15 year period and 110 (18.2 per cent) in the 16-20 years period or 34.6 per cent in the second decade. In the first decade 10.3 in the third 24.4 in the fourth 14.9 in the fifth 9.3 in the sixth 5 and in the seventh 1.3 per cent. Somewhat arbitrarily in order to facilitate comparison with other countries they regard the average incubation period as three years and so work out the proportions infected in successive decades as 19.5 34.7 19.5 13.1 8.0 4.6 and 0.6 per cent that is more than half the patients become infected before the age of twenty years.

Comparing these figures with those from Southern Russia India Moloka and the Sudan the authors give the following figures—

Countries	0-10 years	0-20 years	0-30 years
Cuba	19.49	54.0	73.69
S. F. S. S. R.	19.40	54.70	73.50
India	19.59	47.36	73.41
Moloka	1.50	4.0	1.50
Sudan	39.08	73.17	84.98

The rest of this article gives figures culled from similar reports by individual investigators of leprosy in Spain Mexico the Argentine San Paulo Rio de Janeiro and elsewhere.
H Harold Scott

HELMINTHIASIS

L. LORENTE C BARGE P BERGE C AUDOYE H & FALCONNIER J
Deux nouveaux cas d'infestation par la grande douve du foie
(*Fasciola hepatica*) [Two New Cases of Infestation with *Fasciola hepatica*] *Arch Inst Pasteur de Tunis* 1944 June 31 No 1-2
154-8

The authors have previously reported this *Bulletin* 1942 v 39 703⁷ case of hepatic distomiasis which was far as they knew the first to be recorded in Tunisia. They then said that they thought that this infestation would not be very rare in this region.

Two more cases are now recorded both in Europeans. The first subject was a mechanic aged 34 born at Paramé. In 1938 he had had dyspepsia without painful crises and his blood was then normal. From April till July 1940 he had lived in Sfax and there ate watercress every day. On examination there was pain on palpation of the region of the gall bladder the blood showed a lymphocytosis and 6 per cent of eosinophils. Later pain increased and now came on two hours after food radiating to the right shoulder. Bile was obtained by duodenal intubation and in it the eggs of *Fasciola hepatica* were found. A month later these were also found in the stools together with cysts of *Giardia*. The Casoni reaction was slowly positive. The patient was given 20 injections of anthiomaline. A table gives particulars of the blood examinations.

The second subject was a woman aged 44 who was born in Bizerta and had practically never left that town. Sometimes she had eaten cress bought in the Bizerta market. She had a history of hepatic insufficiency and painful crises suggesting gall stones. There was a lymphocytosis and an eosinophilia of 19 per cent. The liver was much enlarged. Operation in September 1941 revealed a whitish tumour as big as a duck's egg near the anterior border of the right lobe of the liver which may have represented the calcified gall bladder which could not be found. This was extirpated surgically. There was another oblong smooth mass in the liver from which about 250 cc of reddish fluid was drawn off. Some 20 small calculi of cholesterol were also removed. The liver also was studded with whitish granulations the size of a millet seed which histological examination showed to be fibrous tissue. A living *Fasciola hepatica* was removed from the cystic duct. The operation is described. From the biliary fistula resulting from it eggs of *Fasciola hepatica* were obtained. The patient also had a serous parovarian cyst which was removed at a second operation. The patient was exhausted by these two operations and did not have treatment for the fluke. The fluke and material removed from the liver were sent to Professor Joyeux at Marseilles and he reported that the fluke was a sexually mature *F. hepatica* and that the cyst removed was a degenerate hydatid cyst. The authors are unable to say whether the hypertrophic cirrhosis was due to the calculi or the parasite or whether there was any relation between the fluke and the calculi. They are more than ever disposed to think that fluke infestation is rather common in Tunisia and think that examination of bile obtained by duodenal intubation should be done in suspected cases. Cress from unknown sources should not be eaten. [Cf this *Bulletin* 1943 v 40 472 and 1944 v 41 300] G. Lapage

CAMERON T W M The Morphology, Taxonomy, and Life History of *Metorchis conjunctus* (Cobbold 1860). Reprinted from *Canadian J Res* 1944 Feb v 22 6-16 13 figs [20 refs]

This trematode was originally described under the name *Distoma conjunctum* by COBBOLD (*J Proc Innerean Soc* London 1860 Zool 5 1) in England. The original specimen is now in the collection of the Department of Helminthology, London School of Hygiene and Tropical Medicine. Cobbold found it in the bile ducts of an American red fox (*Canis fulvus*) which had died in the Gardens of the Zoological Society of London. Cameron now places it in the genus *Metorchis*.

drainage. Multiple cysts of the lung involving both sides of the thorax should be dealt with in two stages. If calcification has occurred in the liver or lung it is necessary only to suck out the germinal layer and contents leaving the calcified wall behind but suction may be complicated by pneumothorax unless a small catheter is put into the bed of the cyst and connected externally with an under water seal to provide for escape of air. G. Lapeere

GRANA A. Antibodies against Sheep Erythrocytes produced by the Injection of Hydatid Liquid in Patients with Hydatid Cyst. *J. Immunology* 1944 Mar 48 No 3 203-11 [14 refs]

In the serum of 10 patients with hydatid cysts given subcutaneous injections of hydatid fluid Grana (*Di Medico* Buenos Aires 1947 14 109) found a remarkable increase of haemolysins and agglutinins for red cells of sheep. In the present paper he studies the conditions necessary for the appearance of these heterologous antibodies. The material used was the serum of 10 patients with hydatid cysts who were injected subcutaneously with hydatid cyst fluid and there were also normal people and 10 asthmatics as controls. Injections of hydatid fluid were also given to 10 healthy rabbits and their sera were studied. Such antibodies were not increased in the human controls nor in the uninfected rabbits. He presents the hypothesis for the appearance of this type of heterophilic antibodies because these changes are most marked in patients who react most intensely to subcutaneous injections of hydatid fluid and are not seen in people without hydatid cysts nor in uninfected rabbits. The author thinks that work now being done by him suggests that these antibodies are not of the forsera type but represent a new type within the wide group of heterophilic antibodies. G. Lapeere

LARSEN J. E. Jr. Studies on the Artificial Immunization of Mice against Infection with the Dwarf Tapeworm *Hymenolepis nana* var *fraterna*. *Amer. J. Hyg.* 1944 Mar 39 No 2 129-37

HEARIN (this Bulletin 1943 39 93) tried to produce immunity in mice against *Hymenolepis nana* var *fraterna* by intraperitoneal injections of viable adult worms and eggs instead of using antigen prepared from dried worm substance but the mice injected harboured the same number of cystic rodents as the untreated controls infested with *H. nana*. As there is abundant evidence that mice acquire a resistance to infestation a high grade of immunity and develop specific antibodies. LARSEN tried to produce immunity by injecting suspensions of fresh worm antigen. Adult worms were macerated with sterile sand in a mortar about 100-300 washed worms as added to a volume of about 0.03 cc per worm. After settlement for one hour the supernatant fluid was at once used as antigen. The experimental mice were 1 to 6 months old and were known to be free from *H. nana* (see LARSEN this Bulletin 1943 39 322). Each of these mice was given four intraperitoneal injections of 0.03 cc of the antigen over a period of 10 weeks. A week after the last injection these mice and the same number of controls were given

test doses of eggs of *H. nana* varying from 1 170 to 2 000. Six experiments were done and in each of them there were strikingly fewer 93 hour cysticercoids in the mice given the injections of antigen. In the controls the range of percentage development of the cysticercoids was 4.4 to 5.6 in the immunized mice it was 0.03 to 1.1 per cent.

Larsh then tried to transmit this immunity to the offspring. Female mice 3 months old were given the first of five injections of 0.25 cc. of antigen a few days before conception and the other four injections at intervals of four days the last being four days before parturition. The young mice were allowed to suckle and when they were 24-30 days old they were compared with controls of the same age which were born of and suckled by mothers which had not been immunized. All these mice were given test doses of eggs of *H. nana*. In all cases the young of the immunized mothers had fewer 93 hour cysticercoids. The percentage development of the cysticercoids in the immunized series was 1 to 2.2 in the controls it was 2.7 to 3.4. Thus the young of the immunized mothers had an immunity but this was not so high as that of young born of and suckled by infested mothers [see LARSH *loc cit*]. These results agree with those of MILLER [this *Bulletin* 1931 v 28 205] on the immunity of the white rat to infestations with *Taenia taeniaeformis* (*Cysticercus fasciolaris*) and those of KERR [this *Bulletin* 1936 v 33 104] on *Taenia pisiformis* (*Cysticercus pisiformis*).

No attempt was made to define the route of transfer of the immunity but Larsh (*op cit*) showed that it took place both *in utero* and in the milk. The evidence suggests that the milk plays the greater part because the young of non immune mothers nursed by immune mothers show greater resistance for a longer time than those of immune mothers nursed by non immune mothers. CULBERTSON (J *Parasitology* 1938 v 24 65) found that the milk plays a greater part than transfer *in utero* in the transfer of immunity of rats to *Trypanosoma lewisi* and this is also true after artificial immunization against this species [CULBERTSON this *Bulletin* 1941 v 38 314]. G. Lapage

LARSH J. C. Jr. The Relation between Splenectomy and the Resistance of Old Mice to Infection with *Hymenolepis nana* var *fraterna*. *Amer J Hyg* 1944 Mar v 39 No 2 133-7

The author claims that the literature indicates that removal of a large part of the so called reticulo endothelial system as for example by splenectomy influences susceptibility to various infections. In this paper he compares splenectomized and normal mice which were infested with *Hymenolepis nana* var *fraterna*.

The whole spleen was removed and the operation is described. The controls were also operated upon but the spleen was left intact the tissue round it being given the same trauma in order to eliminate from the results the effects of shock. Animals thus treated are called Sham.

The first experiments were designed to indicate whether splenectomy influenced an initial infestation and this was based on the number of 93 hour cysticercoids found [see HUNNINEN this *Bulletin* 1935 v 33 99]. A group of mice operated upon but not infested was included in order to indicate any effects of the operation. Of the 50 mice used 20 were splenectomized 20 were sham and 10 were controls. One week after the operation 10 splenectomized mice 10 sham and 10 controls were selected and three of each group were given 1 200 eggs of *H. nana*.

and the other seven were given 2000 eggs. The number of 93-hour cysticercoids found was about the same in all three groups so that there was no evidence that splenectomy had increased susceptibility to infestation or that the operation had affected it.

Six months later when the rest of the mice were six months old 10 splenectomized mice and 10 shams together with 10 young controls aged 2 months (the most susceptible age) were given 1000 eggs each. The parasite burden in both the splenectomized and shams was only about a quarter of that of the mice used in the first experiment but the percentage development in the splenectomized mice (81) was more than twice that in the ham (11) and was unusually high for mice of this age although the increased resistance in the shams is usual for mice of this age. The ham and control showed normal percentages of haemoglobin (99 and 98 per cent respectively) but the percentage in the splenectomized mice was 79 per cent. This experiment suggested that mice deprived of their spleens when they are young are more susceptible in later life. A more elaborate experiment was done on similar lines in which individual among 70 mice (35 splenectomized and 15 shams) were given eight tests at intervals of one week to 10.5 months after operation. The result indicated that when the mice were 2.5 months old the average percentage development of 93-hour cysticercoids was 6.0 in the splenectomized 5.8 in the shams and 6.2 in the controls. When the mice were 3-5 months old the corresponding figures were 3.6, 3.4 and 5.6. When tests were done at the ages of 5, 10, 11, 12 and 13 months the percentage development of cysticercoids was still higher in the splenectomized mice (7.5 in the third test to 5.4 in the fifth) than in the shams (0.9 in the third test to 0.1 in the sixth) in the controls it was about the same in all these six tests (4.6 in the sixth to 6.3 in the seventh). The haemoglobin in the ham and controls was 95-102 per cent in the splenectomized mice it gradually dropped from 101 to 74 per cent. At 3.5 months the shams seemed to be showing age resistance already but in the last six tests some shams showed no cysticercoids at all and the largest number found was only 34 at the fourth test. Their haemoglobin level was practically unchanged throughout and was similar to that of the control. But the splenectomized mice in the last six tests showed a well-defined susceptibility which in some cases almost equalled that of the control. Mice which were only 2-5 months old at the most susceptible age also fell in their haemoglobin percentage became pronounced in the later test. The author therefore thinks it reasonable to suppose that the anaemia is one factor in their increased susceptibility but it is not known how it operates. It was not due to infection with *Bartonella* because this was not found in smears.

G. Lapa e

WATT, J. V. C. The Influence of Vitamins B₁ (Thiamine) and B₂ (Riboflavin) upon the Resistance of Rats to Infection with *Nippostrongylus*. *Amer. J. Hyg.* 1944 Mar. 39 No. 2 145-51

The author reviews some of the literature which indicates that lack of the vitamin B complex renders animals more susceptible to helminth infestation (e.g. *Ascaridia lineata* in poultry). Inquiring into the question of which element in this complex is responsible he concludes that deficiency of either riboflavin or thiamin reduces the resistance of rats to infestations with *Nippostrongylus muris*.

Details of the different diets given are recorded. The criteria of resistance are (1) the number of *N. muris* remaining in the intestines of rats at the end of the second week of the infestation (see SCHWARTZ ALICATA and LUCKER *J Wash Acad Sci* 1931 v 21 259) (2) the distribution of the worms not only in the intestines but also in the lungs 12 to 14 days after the infective larvae have been given (3) the effect of partial vitamin B₁ (thiamin) deficiency on the immunological potency of the plasma or sera in passive transfer of immunity. Experiment 1 showed that after a primary infestation with 2 300 larvae of *N. muris* there were more worms in the rats on diets deficient in Vitamin B₁ but the difference was not striking. Experiment 2 showed that B₁ deficiency reduced resistance to superinfection (i.e. when 2 000 larvae were given at the peak of the infestation caused by 2 000 larvae previously given). In experiment three rats on a normal diet received a series of infestations with larvae some of them were then put on diets deficient in vitamin B₁ and some were not all being again infested. There were more worms in the rats put on the deficient diet. Resistance to subsequent infestation was thus reduced by vitamin B₁ deficiency. Earlier work has shown that sera and plasma from hyper immunized rats when they are given to normal rats protect them from infestation with *N. muris*. Watt found however that rats given immune plasma from rats fed on a diet deficient in vitamin B₁ had more worms. This plasma had therefore not been as effective as immune plasma taken from rats on a normal diet.

Similar results were obtained when the diets were deficient in vitamin B

C Lapage

ARDAO H A & ZERBONI E. Ileo vermicular. Radiologia de las ascaridiasis [Vermineous Ileus. Radiology of Ascariasis] *Arch Uruguayos de Med Cirug y Especialidades* 1914 Jan v 24 No 1 82-93 12 figs

The patient an adult male had suffered for three days from diffuse abdominal pains which had increased to become violent colic mainly supraumbilical. On admission he was well nourished but the abdomen looked asymmetrical being inflated in the hypogastrium and left iliac fossa. Palpation revealed an elastic mass resembling an intestinal loop which was movable towards the median line and was very painful palpation causing crises of pain. The mass was directed obliquely downwards and disappeared into the pelvis at the top of the pubis. Rectal examination revealed a painful mass in the pelvis apparently continuous with the mass in the hypogastrium. Laparotomy showed an enormous loop of the small intestine (ileum) 40-50 cm long. It was reddish with numerous punctiform ecchymoses. There were large subserous effusions especially at the union with the me enteri and in these there were numerous roseate tumours like kidney beans with haemorrhagic foci in them. In this loop undulatory movements were seen. As well as the reddish colour there were numerous raised whitish areas. The loop was elastic malleable and gave the sensation of packets of worms matted together. The whitish raised areas corresponded to the angles of the matted worms. Enterotomy was performed and about 128 specimens of *Ascaris lumbricoides* were removed but numerous worms remained above and below the enterotomy. After a purging enema the patient expelled 12 more. He recovered without incident. Diagrams illustrate the operation done.

OLDHAM J N & WHITE E G Chronic Focal Interstitial Hepatitis in the Pig Its Experimental Production by feeding *Ascaris* Eggs
J Comp Path & Therap 1944 Jan v 54 No 1 1-15
13 figs (12 on 4 pls)

The success of these authors in clearing up the aetiology of white spot liver of pigs is now well known (WHITE *et al* *J* 1941 v 97 155 and OLDHAM & WHITE *Vet J* 1942 v 98 16). The present paper which is a more extensive and detailed study of this problem should be read by everyone interested in it. Eggs were obtained from the uteri of female *Ascaris lumbricoides* as for the earlier experiments these eggs were incubated at 30 C for 12 weeks before they were fed to rabbits and guineapigs to test their infectivity. This long incubation was done because *Ascaris* eggs which are said to become infective at about the 18th day must go through a post embryonation time lag (maturation period) before they become infective. In 1940 the infective eggs were fed to 9 pigs 8-11 months old. Four of these were given 1 600 000 eggs in the combined feed for all of them and four were given 400 000 eggs each by the mouth with a hypodermic syringe one ratling was given 200 000 eggs. At intervals the pigs were killed and the liver and kidney were sectioned and examined. The minced liver and lungs were also examined for larvae in a Baermann apparatus. Just before killing blood films were taken. The peritoneal and thoracic cavities and the trachea of some of the pigs were washed out with saline and the washings examined for larvae. The faeces of each pig were also examined for eggs by the sugar floatation method. In the second experiment in 1941 11 weaned pigs 11 weeks old were used. These were selected from a sow whose faeces had been examined for *Ascaris* eggs at intervals of three weeks and had been always negative. This was done because the first experiment had been complicated by the presence of immature *Ascaris* in the intestines of some of the pigs. It turned out however that the attempt to obtain an *Ascaris* free pig had failed so that both experiments were confused by natural infection. In this second experiment additional blood films were examined when the eggs were given as well as when the animals were killed and a modified Baermann method was used. A table and graphs give the results of the blood examinations and full protocols record the results. They cannot be summarized here. There are good photographs of the whole liver and of sections of livers and one of a lung.

The first experiment showed that lesions identical in appearance with those of natural white spot liver can be produced in young pigs by feeding them with embryonated eggs of *Ascaris*. Early lesions showed a central haemorrhagic zone with destruction of liver cells and intense eosinophil infiltration followed by absorption and repair and fibroblast proliferation in the neighbouring interlobular septa. Old lesions showed persistent thickening of the septa and eosinophil infiltration. Lymphoid tissue was formed in the lesions and the larger masses of this formed spherical follicles like those which have been described in the natural lesions. Although most of the lesions appeared to be on the surface of the liver many deep lesions were demonstrated by sections. The fact that the lesions on the anterior and posterior surfaces of the liver were roughly similar in number supported the generally accepted view that the liver is infected through the portal vein and not through the peritoneal cavity. No larvae were found in peritoneal washings. Experiment 2 confirmed the findings of experiment 1.

In the blood the only significant change was the eosinophilia. The highest level reached was 37 per cent. The development and time relation of the eosinophilia in pigs given a single large dose of eggs are similar to those in pigs given a marked rise in the blood eosinophil count only the initial dose and a marked rise in the blood eosinophil count return to normal in four to five weeks so that a differential white cell count is not likely to be of value in diagnosis except in the initial mortality phase of the parasites.

ME O T B RAJA ICRRI B & SUNDARASNA PAO D Lizard
Filariasis An Experimental Study Trans Ro Soc Trop Med
-4 1944 May 37 No 6 373-86 1 diagram & 4 pl

Filariasis An Experiment 37 No 6 1944
- 4 1944 May 37 No 6 1944
10 r f

The authors have worked out the course of development of the parasite in the lizard *Uta stansburiana* and is like that transmitted by *Culex fatigans*. Throughout their paper they have described their findings in relation to what is known about the life cycle of the parasite. In both species the developmental stages in the vector are the period of maturation of the larvae, the effects of temperature, humidity, etc. and of hyperinfection of the vector are all closely similar. The authors regard as significant the development of the larvae of the lizard species in the deeper lymphatics and their tendency to migrate along the lymphatics to the mesenteric lymphatics. The developmental stages are fully described to ether with the lesions produced. Discussing the mechanism of lymphatic obstruction the authors conclude that it is due to inflammatory changes round the worms. Photographs illustrate the paper one showing oedema of the mesentery and another showing the larvae in the mesentery and common. The

Excellent photographs illustrate the paper one having oedem of the lizard forelimb and one the larvae in the mesentery and lymphatics. Visible oedema was not however common. The were no early effects on the lizard. If the infestation is heavy the lizards become inactive lose appetite cease to have colour changes in the skin and after a period of torpor they die.

G. Lapa

M. S. DE JAREST Constance R. Loaisa

to Diagnosis by Skin

CULBERTSON, J T ROSE H M & DE LAREST Constance R Loaasis
and Onchocerciasis a New Antigen for their Diagnosis by Skin
Test Amer J Hyg 1944 Mar 39 \ 2 152-5 1 fig

Loiasis and onchocerciasis are rare in the United States. The serological diagnosis of them is usually attempted with antigen prepared from *Dirofilaria immitis* of the dog but *Contortosporium* here of the or trich has been tried by MOHR and LIPPELT. The Billet in 1941 35 318, author tried *L. tomosoides carinii* from the cotton rat (*S. modon* Trach. Med. & Parasit. 1934 28 143) which

The author tried *L. tomosoides carinii* from the cotton rat (*S. modon hispidus*) (see Vaz Ann Trop Med & P 1934 28 143) which is present in a considerable percentage of cotton rats and often in large numbers. As many as 5 may be found in the pleural cavity of one rat and they have proved to be a rich source of antigen.

present in a considerable number. As many as 5 may be found in the rat and they have proved to be a rich source of antigen. The antigen is made by washing the worms repeatedly in water, drying them in the air at 37 C followed by trituration in a mortar. A 1 per cent emulsion of the worm powder thus obtained is made in 0.5 per cent carbol saline, this is incubated at 37 C centrifuged and the supernatant fluid used as stock. For the intradermal test 0.1 cc of this was injected into the solar surface of the forearm.

An extended weal with pseudopodia increasing in size and prominence for 5-6 minutes constitutes a positive reaction. After 15 minutes the weal faded but local oedema and induration often persisted for 6-24 or even for 48 hours. In some tests there was also erythema but this also occurred in the controls and it was ignored as a diagnostic sign. Two patients with loiasis were tested. The first a white male aged 18 who had been born in and had lived in Nigeria had seen an adult *Loa* in his eye several times and had had fugitive swellings on his arm and legs there were numerous microfilariae in his blood. The second was a white woman of middle age a zoologist who had visited the Belgian Congo for two weeks in 1936. On her return to New York she had had a generalized urticaria. She had seen a worm in the conjunctiva but no microfilariae were found in the blood. The skin tests done on both were positive (immediate reactions).

Two patients had onchocerciasis. They were a mother aged 35 and her boy aged seven who had returned from Guatemala. The boy had several *Onchocerca* nodules and two had been removed from him earlier. He also had episcleritis and punctate areas of subepithelial infiltration in the cornea but no microfilariae were found in his blood. The mother had no symptoms of onchocerciasis but had one nodule at the base of the scalp. Both gave immediate reactions and also a delayed reaction which was severe in the mother her arm being swollen to the shoulder for five hours and tender for 48 hours. Both were negative to carbol saline alone.

Tests were then done on 40 persons not suspected of filarial infestation. Of these 38 were negative. Two showed distinct weals with pseudopodia. One of these a medical student had given a positive skin test two years earlier to *Trichinella* antigen (see below) the other a negro of 30 has since shown enlargement of the thigh suggesting elephantiasis.

No tests have yet been done on possible cross reactions with other nematodes which are not Filarioidea but positive reactions with some of these are expected. Further work is required to indicate whether this antigen is better than that derived from *Dirofilaria immitis*.

G Lapage

CULBERTSON J T ROSE H M & DEMAREST Constance R
Filariasis bancrofti its Diagnosis by Immunological Tests with
Antigen derived from *Litomosoides carini* Amer J Hyg 1944
Mar v 39 No 2 156-62 1 fig

From the Tahiti area where *Huchereria bancrofti* is endemic 110 soldiers returned to New York after a 12 months stay there. Many had had temporary enlargements of the scrotum and testis and some had had temporary enlargements of the limbs and forearms. Practically all had had lymphadenitis at some time but no microfilariae were found in the blood of any of them. When preliminary skin tests with antigen derived from *Litomosoides carini* (see above) were done seven out of nine men tested gave some response. Further tests were then made on 81 men and the blood of 77 of these was taken for precipitin and complement fixation tests and for examination for eosinophilia and microfilariae. The antigen dilution used was about 1:200 for the skin tests. For precipitin and complement fixation tests 5 per cent by weight of the worm powder was extracted with saline without phenol at 37 C for two hours and centrifuged. The

supernatant fluid was then diluted with four parts of saline making a dilution of about 1 in 125 of the antigen. For the skin test 0.1 cc of antigen was injected into the forearm (see above) for the precipitin test 0.1 cc of the patient serum was overlaid with 0.1 cc of antigen. Precipitation usually light. For complement fixation 0.01 and 0.005 of inactivated serum as mixed with 0.1 cc of antigen and 0.1 cc of complement and saline. After fixation at 37 C for 30 minutes 0.1 cc of a 5 per cent suspension of sensitized sheep cells was added. Of the 51 skin tests done 66 (81.4 per cent) reacted within five minutes. Of the 77 complement fixation reactions done 59 (76.6 per cent) were positive and 18 were negative. Of the 77 precipitin reactions 55 (71.3 per cent) were positive and 19 were negative. Out of 11 patients showed more than 4 per cent of eosinophils. The highest had more than 10 per cent. 21 per cent being the average record. In 17 patients the percentage was 1 or less. The microfilariae were found in any of the patients examined for them. The correlation between the tests was only fair. Control tests were done on 40 persons not suspected of filariae. The group of persons used for these controls was apparently the same as that used for the control of the skin tests on patients with loiasis and onchocerciasis reported by these authors see above. Control precipitin tests were done on 50 random blood samples from the Warman Department. Of these 46 were negative. One of the four positive was the negro suspected of elephantiasis mentioned above. Thirty similar samples were used to control the complement fixation. 11 of these showed some degree of complement fixation.

The authors think that a negative skin test of persons probably not infected with filaria will give a high also gives positive complement fixation tests. The antigen which also gives positive reaction with L. and O. (see above) but these could be distinguished from negative with H. filicri by clinical signs. More difficulty may be experienced in infections with *Trichinella* and *Leishmania*.

CULBERTSON, J. F. & R. H. M. Chemotherapy of Filariasis in the Cotton Rat. Administration of Neostam. Science 1944 Mar 4.

A filarial infection *Leishmania des carini* is a frequent parasite of the Florida cotton rat and the microfilariae can be seen in the peripheral blood of the animal. The rat is therefore a suitable animal for chemotherapeutic tests. Among the drugs tried stibamine glucoside (neostam of Messrs Burroughs Wellcome & Co.) gave particularly favourable results. It was administered intramuscularly to 10 cotton rats in doses of 40-60 mgm four times a week for four to nine weeks. Two untreated rats served as controls. The tail blood was examined almost daily and the microfilariae counted. At the end of each experiment the rat was killed and examined. The numbers of microfilariae in the treated rats diminished greatly within a few weeks and in every case none was found on the day the rat was killed. No living adult filariae were seen post mortem but dead ones often matted together and numbering

up to 50 were found. In the two control rats the microfilariae remained numerous in the tail blood and living adults were found after death.

The authors suggest that this drug should be tried in human filariasis as NAPIER [this *Bulletin* 1929 v 26 743] found that it was well tolerated. [The doses given to the cotton rats were relatively very much larger than those used by Napier.]

J F Corson

DEFICIENCY DISEASES

JONES H E ARMSTRONG T G GPELN H F & CHADWICK V
Stomatitis due to Riboflavin Deficiency *Lancet* 1944 June 3
720-23

An examination of over 10 000 men of many races in a North African camp has been carried out. Just under 17 per cent exhibited stomatitis—sore lips, sore tongue, excessive salivation, etc. Some showed a seborrhoeic condition in the nasolabial folds but in none was scrotal dermatosis noted and routine examination yielded no other evidence of disease. A very full account of the tongue and lip changes is given which should prove most useful to those not already familiar with these conditions. The observations include slit lamp findings in both normal and affected tongues. [Concerning the use of the slit lamp to study the tongue lesions the authors say: 'so far as we know this has not been done before' but of course the method has been used by other observers for several years.]

The onset of the stomatitis is clearly demonstrated to have occurred in relation to the change from one standard diet containing 1.61 mgm. riboflavin to a second standard diet containing only 1.0 mgm. When a third standard diet containing 1.73 mgm. riboflavin was introduced the symptoms disappeared.

The condition was uninfluenced by calcium lactate, red palm oil (vitamin A), oleum vitami (vitamins A and D) or nicotinic acid but cleared up when milk, meat or eggs were added to the diet while yeast $\frac{1}{2}$ oz. daily or riboflavin 10 mgm. b.d. for 5 days gave the most rapid results.

As a vascularizing keratitis is said to be associated with the mouth changes in ariboflavinosis, 75 cases were examined by an ophthalmic specialist who reported that all showed increased vascularity in mild degree but that all were suffering from trachoma which is almost universal in North Africa; vascularization is characteristic of trachoma. [It would have been interesting to have had further details upon the last point as it is not clear whether the ophthalmologist was of the opinion that he could not distinguish between corneal vascularization due to riboflavin deficiency and that due to trachoma or whether in the presence of the latter he was unable to determine the presence of the former.]

H S Stannus

VENOMS AND ANTIVENENES

SERGEANT E. Sérothérapie antiscorpionique. Nécessité d'une intervention rapide. Délai d'efficacité de l'injection du sérum antiscorpionique après la piqure du scorpion. [Treatment by Scorpion Antivenene. The Need for Early Injection.] *Arch. Inst. Pasteur d'Algérie* 1943 Dec v 21 No 4 263-7 1 fig.

In this note the author points out that although antivenene should be administered as soon as possible after scorpion sting, cure has been

effect in persons apparently in desperate condition even if the serum was not given until many hours had elapsed. He quotes a successful case in which the delay was from 10 to 30 hours. Nevertheless the proportion of deaths was almost twice as high in those who did not receive anti-erythema in the first three hours as in those who did.

Charles Wilcocks

DERMATOLOGY AND FUNGUS DISEASES

5. J. S. & HARLEY P. D. Dermatitis Venenata and Keratoconjunctivitis caused by the Manzanillo Tree. *Arch Dermatol Syph* 1944 Apr 43 No 4 30-1 fig

6. LEVIN S. H. JR. GORDI I. & PETERS M. A Case of Histoplasmosis Darling with Autopsy. *Amer J Med Sci* 1944 Mar 107 No 3 315-8 4 fig

The interesting feature of this case of histoplasmosis in a young negro child is the close resemblance clinically of the disease to tuberculous chills and fever, severe night sweating, loss of weight, anorexia and productive cough with blood streaked purulent sputum. However, the chest X-ray examination showed extensive infiltration of both lungs milary in type which led to the diagnosis of pulmonary tuberculosis, but this diagnosis was not confirmed bacteriologically after many examination of the sputum.

The patient died after only thirteen days in hospital and the diagnosis of histoplasmosis was made on the results of microscopic examination of the tissue. The disease was most extensive in the lungs but the liver, spleen and other organs were also extensively affected. A detailed description is given of the gross and microscopic morbid anatomy and the authors point to the pathological picture of the bone marrow by the specific granulocytic tissue as a clue to the anaemia and leucopenia.

J. T. Duncan

7. TRUPINGER J. M. Histoplasmosis. Report of Its Occurrence in a Dog. *Am J Pathol* 1944 Feb 137 No 2 140-49 4 figs

A second case of canine histoplasmosis calls attention to the possibility that the dog may be the natural host and transmitter of the disease.

MISCELLANEOUS

COLONIAL DEVELOPMENT AND WELFARE ACT 1940 Return of Schemes made under the Colonial Development and Welfare Act 1940 by the Secretary of State for the Colonies with the concurrence of the Treasury in the Period from 1st April 1943 to 31st March 1944 Cmd 6532 16 pp 1944 London H M Stationery Office [3d]

COLONIAL RESEARCH COMMITTEE First Annual Report 1943-44 Cmd 6535 11 pp 1944 London H M Stationery Office [2d]

KARK S I & LE RICHE H A Health Study of South African Bantu School Children *South African Med J* 1944 Mar 25 v 18 No 6 100-103

This study was made in 1938-39 under the direction of the Secretary for Public Health and comprised the examination of about 800 school children in each of nine areas (three urban and six rural) in the Transvaal the Orange Free State Natal and Cape Province—a total of over 7 000 Each child was given a physical examination which included somatometric measurements and various laboratory tests were made on a random sample in each area Examination was made of the skin tonsils cervical glands and ears eyes heart and lungs posture liver and spleen haemoglobin faeces for parasites urine the Wassermann reaction The incidence of abnormalities was high and figures for the various conditions are set out in detail There was considerable evidence of nutritional deficiency throughout especially of riboflavin and nicotinic acid and possibly of vitamin C Cervical gland enlargement was present in almost three quarters of the children often associated with enlarged or septic tonsils Trachoma probably causes much of the eye trouble

Postural deformities due to poor musculature from malnutrition were found in about one-third of the children and bony deformities in 1 16 per cent The causes of the latter included injury tuberculosis rickets infantile paralysis and syphilis Enlargement of the liver was fairly common in most districts and though schistosomiasis and syphilis may account for some of the cases it is felt that further research into the influence of various food deficiencies would be of interest in this connexion Splenic enlargement was recorded in four areas only The mean haemoglobin percentages were about 88 over the whole survey Intestinal schistosomiasis was found in one area *Ascaris* infection in four *Hymenolepis nana* infection in five and *Taenia* infection in seven Urinary schistosomiasis was much more common than the intestinal form being found in five areas in one of the the percentage of infected children was 70 The Wassermann reaction was positive in 4 76 to 46 38 of children in the various districts but there was no difference in incidence between the urban and rural groups

Body measurements showed that Bantu children are significantly lighter and shorter than white and the authors conclude that environmental factors such as nutrition and preventable diseases are at least as important as hereditary factors in determining the size of the children In a comparison between the good and bad areas from the point of view of obvious signs of ill health or malnutrition it was clear that height and weight varied according to the other signs

Finally the authors remark that food policy should aim not at providing this or that particular food factor but at increasing all

food tuffs which tend to build a healthy Bantu population and avert
 this is at present in some cases virtually starvation. Most of the
 remaining conditions which affect the health of these people are
 preventable
 Charles W. Ilcocks

FILE NO. M H Some Characters exhibited by a Strain of
P L n r Isolated from a Case of Chronic Melioidosis South
African M J J 1944 Apr 8 v 18 No 7 113-15

Laid on M... Colated from a Case of... No 7 113-15
 P L n r 1944 Apr 8 v 18
 African Med J

The rough and smooth forms described
 by Parker in detail. In morphology stain
 and ultrastructure the corresponding difference was the
 one interesting difference was the
 rough form which were more numerous in the rough
 culture but in older cultures were resistant to 2.5 per cent
 sulphuric acid for 30 minutes. These granules disappeared on
 prolonged ultrasonic treatment but were restored in animal by infection
 in a broth source. The acid fast property was destroyed by
 treatment with alcohol in a few seconds. The only unusual cultural
 feature noted as the liquefaction of Loeffler's medium (without
 glycerol) by the rough variant. Growth of the rough variant on agar
 had a pronounced aromatic odour. GRANT and BARWELL (this Bulletin
 1943: 40-498) made a similar observation. Both variants were
 destroyed by exposure to 60°C for 30 minutes and 50 per cent alcohol for
 five minutes and 6 per cent sulphuric acid for five minutes. Exposure
 to 10 per cent urea killed the smooth form in four minutes and the
 rough form in six minutes. The sera of rabbits immunized with
 forms killed by heat (60°C) gave large-flake agglutination with
 formalized suspensions of the rough and smooth variants. Neither
 these sera nor the serum from the patient from whom this strain was
 isolated agglutinated alcohol treated suspensions. Both forms were of
 equal pathogenicity for guinea pigs, rabbits and mice and inoculation
 of these species of animal with heat killed cultures engendered no
 immunity. Five species of South African rodents—*Otomys tropicalis*
Mastomys natalensis, *Mastomys natalensis*, *Mastomys natalensis*, *Mastomys natalensis*, *Mastomys natalensis*
Platysomys sp. m. l. o. — were shown to be susceptible. S. P. Bedson

Plaidom s p m l o — ere no n

DENNIS W M & DICK A L Surgery in West Africa Experiences
in a Military Hospital J Roy Army Med Corps 1944 Mar
82 No 3 112-24 2 figs
Africa recruit training centre There
with of the m no

The hospital served a large Africa recruit training centre. There as pract call, no war surgery and case are mostly of the m nor c ulian type though d sabling. Almost 40 per cent were pyogenic though the incidence of accidental infection in hospital as no h her than at home.

Topical Myositis affect more of the larger muscles usually in the thighs, as invariably due to *Staphylococcus aureus* or *albus*. *M. furcata* are found in the blood of 40 per cent of these cases and many had septicaemia for 3 per cent developed pyaemia. Half the cases with abscess formation on sulphathiazol in doses of 6-1 gm in 4 hours (doe stated in text as 6-12 mgm) surely an error. Secondary anaemia was a notable feature in severe cases.

Stamp Foot or infected haematoma of the sole was commonly caused by drilling for duty or pleasure by enthusiastic bootless recruits

Crab Yaws was not easy to diagnose but tender nodules in the soles irrespective of fissures and spongy heels could be cured by N A B with or without Sobita combined with large doses (up to 90 grains daily) of potassium iodide

Tropical Ulcers mostly on lower limbs usually showed Vincent's spirochaetes. Excision proved more effective than closed plaster or elastoplast methods which in the author's opinion usually cause extension of the ulcer. [No mention is made of simple curettage with a sharp spoon followed by the application of iodoform usually the most successful and time saving treatment]

Filariasis A few of the symptoms associated with *Wuchereria bancrofti* and *Loa loa* are described. *Onchocerca volutus* tumours were frequently met with though no reference to ocular symptoms or skin lesions is made. The dangers of winding out Guinea worm are stressed [but no reference is made to phenothiazine injection treatment]

Amoebiasis Two cases of liver abscess required operation after emetine treatment and needling. Four patients with masses in the right iliac fossa simulating appendicitis came to laparotomy. In each there was an abscess not due to the appendix or to obvious perforation. There was a history of dysentery in all and in three *E. histolytica* was found in the stools. They are regarded as abscesses following dysenteric ulceration of the caecal region.

Not one confirmed case of appendicitis was reported

There are orthodox notes on snake bite and scorpion sting the latter always relieved by injection of a local anaesthetic

Various other not specifically tropical conditions are discussed and a warning that even in Africa common things most commonly occur and that obscure explanations should not always be sought for

C C Chesterman

GRINDLAY J H Treatment of Skin Infections in the Assam Burma Jungle Bull U S Army Med Dept 1944 Mar No 74 74-80
1 fig

For wounds and infections of the skin the author advises that ointment should never be used in the tropical conditions of Assam and Burma because the greasy base prevents normal drying of the skin and encourages maceration of cornified epithelium by sweat thus creating conditions suitable for the spread of infection. Small traumatic wounds should be cleaned with soap and water and a stiff brush should be painted with picric acid or tincture of mercurochrome and covered. To clean an infected small wound a continuous wet dressing of 50 per cent magnesium sulphate in glycerin is advocated the dressing being kept wet with 50 per cent watery solution.

Most of this paper is concerned with tropical ulcer (Naga sore). The author inclines to the belief that this condition is related to beriberi both occur in the monsoon season signs of beriberi are common in those suffering from ulcer brewer's yeast and thiamin are helpful in treatment. Tropical ulcer usually arises in a small abrasion or insect bite most commonly a leech bite its course may be acute and fulminating with destruction of tissue down to periosteum. Treatment should include treatment of any coincident systemic disease such as malaria or dysentery.

had malaria two effusion six jaundice and one peritonitis One of the pericarditis patients died

Among the 59 type 5 cases there were no deaths The commonest complications were jaundice (11) pleural effusion (4) empyema (3) in four resolution was delayed Six patients did not respond to sulphapyridine although there were no obvious complications [Presumably the author means when they were first seen for he goes on to say Two developed fatal complications meningitis and pericarditis and two others had tuberculosis also Another had an unsuspected small pleural effusion] In the author's view if no response to sulphapyridine is shown in 48 hours judging by the temperature chart the drug should be discontinued [Two other consecutive sentences are a little difficult to reconcile The author states The low mortality in the severely ill or sulphapyridine from the onset group was undoubtedly due to the drug The sentence preceding this runs thus The vast majority of cases recovered in spite of sulphapyridine therapy and even though cases were left until they had to have specific drug therapy the mortality complications and response to the drug were not altered]

H Harold Scott

STACEY R S Portal Cirrhosis in Iraq *Trans Roy Soc Trop Med & Hyg* 1944 May v 37 No 6 387-98 1 graph [30 refs]

The aetiology of cirrhosis of the liver in the Middle and Far East is very puzzling and any serious attempt to solve the difficulty is to be welcomed The author's studies reported in this article were based on 127 cases personally investigated All but two of the patients belonged to the poorest classes—fellahs labourers brickmakers pedlars Men seemed to suffer in greater numbers than women but no reliable figures can be given because women are reluctant to come to hospital Most of the patients are between 30 and 40 years of age The earlier stages are rarely seen because patients do not apply for treatment until ascites interferes with their ability to work Fever and chills often precede the abdominal distension repeated tapping may be needed up to 50 times About two thirds have oedema of the legs thighs abdominal walls genitalia and back in some this is ascribable to pressure on abdominal veins but not in all for the oedema may precede the abdominal distension and the oedema may not be relieved by tapping moreover dilated veins of a collateral circulation are not commonly seen The oedema in some at least is more likely due to lowering of plasma osmotic pressure from the liver damage Wasting is marked in the later stages The liver is not enlarged and the average weight at autopsy was 1 063 gm the spleen is enlarged in 65 per cent of cases it is hard not tender and the average weight was 826 gm Jaundice is far from common and fever to 38.5 C is present for short periods only a few days to two or three weeks and only in some of the patients There is no tendency to haemorrhage or marked gastro intestinal disturbance Evidence of syphilis was slight and the W R was positive in less than one third of the patients The formol gel reaction was strongly positive in 68 per cent negative in 11 per cent weakly positive (i.e. the serum became semisolid) in 21 per cent The serum euglobulin value (expressed as tyrosine) was above 60 in 96 per cent of these cases whereas in a control group it was below this in 95 per cent It is known that the euglobulin is raised in

iridocyclitis with recurrent hypopyon and haemorrhagic retino neuritis. In December 1939 he was said to have become depressed and to have developed severe headaches and dizziness. In March 1940 convulsions appeared at irregular intervals and he was admitted to the hospital in a state of unconsciousness on March 20th and died on March 24th 1940. The cerebrospinal fluid examined before death showed 95 cells per cmm (40 polymorphonuclears 55 lymphocytes) weakly positive Nonne Apelt reaction positive Pandy test protein 49 mgm per 100 cc and negative Wassermann reaction.

A *post mortem* examination was made. The meninges at the base of the brain were thickened and small foci of softening were seen near the substantia nigra. Microscopic sections showed perivascular infiltrations of round cells scattered old necrotic foci with pseudotubercular cells in the substantia nigra and round cell infiltration around the central artery of the retina in the optic nerve and in the choroid coat of the eye. The other organs of the body showed little change.

The author states that the cause of the syndrome is unknown but that it has a clear relationship to *ulcus vulvae acutum* (Lipschutz) which is a general disease with a tendency to form metastases.

J F Corson

PATRICK T L L Combined Use of Sodium Evipan and Luminal in Tetanus. *Caribbean Med J* 1944 v 6 No 1 50-53

According to hospital returns tetanus in Trinidad has a fatality rate of about 60 per cent one reason being that patients do not usually present themselves for treatment till they have been ill for four days or so. The author records four cases under his care two of them mild which cleared up uneventfully after injection of a single dose of 40 000 units of antitoxin. The other two were more severe with spasms recurring every few minutes.

The first was a woman of 21 years who in the course of ten days received 80 000 units of antitoxin intravenously and 50 000 intramuscularly and 28 grains of luminal in 2 grain doses and 8 gm of sodium evipan in 1 gm doses intravenously. A fortnight after the last dose the patient was discharged cured. The second was a lad of 15 years with a wound of his right foot his symptoms began four days before admission and his spasms were recurring every ten minutes. He was given 60 000 units of antitoxin intravenously at once on being seen. 16 days later he had another 20 000 units. For the rest treatment consisted of luminal 1 grain daily (on two days 2 grains) a total of 12 grains being given and sodium evipan intravenously two doses of 1.5 gm two days after admission then 1 gm daily for three days followed by 0.5 gm daily for three more days 7.5 gm in all. Recovery was uneventful. As noted by the author VIGORS EARLE in 1939 reported five cures out of six cases treated with sodium evipan and antitoxin.

H Harold Scott

MIDDLEKAUFF W W & CARPENTER S J New Distribution Records for the Mosquitoes of the Southeastern United States in 1943. *J Econom Entom* 1944 Feb v 37 No 1 88-92

CERQUEIRA N L Lista dos mosquitos da Bolivia (Diptera Culicidae) [The Mosquitoes of Bolivia]. *Mem Inst Osvaldo Cruz* 1943 Aug v 39 No 1 15-36 2 figs (1 map) English summary

CEPQUEIRA \ L. Algumas espécies novas da Bolívia e referência a três espécies de Hematofagos (Diptera Culicidae) [Three New Species of Hematophages in Bolivia] Mem Inst Osald Cruz 1943 Aug v 39 No 114 35 pls English summary

HEPRICH A & LIEBMAN H Zur Kenntnis der menschlichen Coccidien The Coccidia of Man Ztschr f Hyg u Infektionskr 1943 No 0 125 No 34 331-63 9 figs [Numerous ref]

Have encountered cases of human coccidiosis in Africa the authors have been able to study in detail the development of the oocysts. In 20 cases the oocysts as passed in the stools were unopened and corresponded with those which have been recorded in the literature of the world. The authors have been able to observe the influence of temperature and pH of the faeces on the rate of development and to describe a number of abnormalities not hitherto recorded.

In the case of the entomothelys they have been able to repeat an experiment made by REICHENOW in 1922, this Bulletin 1925 27 343. In the fresh stool a single pair of fully developed sporozoites could not be clearly distinguished. They adopt the membrane which would not be clearly distinguished. They adopt the shape of the oocyst that the sporozoites are from a coccidium and that the form observed in the 6 other cases in which undeveloped oocysts are passed is a distinct species *Isospora belli* WENYON. This paper adds a long one which records the entire literature of the subject but adds nothing new beyond certain details of the development of the oocysts. C M Wenyon

MORTON T C Heat Effects in British Service Personnel in Iraq Trans Roy Soc Trop Med & H 1944 May v 37 No 6 347-67 4 graphs & 2 charts Discussion 367-71 SACHS A DRE K BLIXTON P J JALLES S P WINTERLOW J LADELL W S S POTTER L BIGGAM A G MCARDLE B SCOTT H H MORTON T C (in repl)

This paper is based on the experience of several summers in Iraq. In July and August the shade temperature often rises above 100°F. There is a considerable fall at night and the humidity is low. In discussing the aetiology the author stresses the cumulative action of heat and a result of which the greatest incidence of casualties occurs on the third or fourth day of a heat wave. This point of importance for prophylaxis. He goes on to say that meteorological factors such as humidity play an important part as regards the suppression of sweating and that heat hyperpyrexia syndrome is common in humid areas such as Baghdad. Heat cramps are more common in hot dry areas. The statement is not supported by evidence in the paper. Information about the relative incidence of various types of effects of heat in climates of different humidity is incomplete in the literature and much needed. Other aetiological points mentioned are lack of acclimatization and salt deficiency.

Cases of effects of heat are divided into three groups—syncope heat exhaustion and heat hyperpyrexia. Syncope is briefly dismissed as a temporary cardio-vascular collapse without reduction of urinary chlorides. The description of heat exhaustion is drawn from a series of 30 cases. These subjects tended to be of a particular type—lean nervous men with a low blood pressure usually sedentary workers. One third of these patients were teetotallers and two-thirds were in their first hot season. The leading symptoms were nausea and vomiting dizziness constipation and cramps. Sweating was profuse and the urine volume diminished. The blood pressure was in many cases low but the figures quoted show that this was not invariable. It is stated that the urinary chlorides were in all cases much reduced but figures are not given. Estimation of urinary chloride by the simple test of Fantus is considered to be of value for differential diagnosis e.g. from vomiting caused by surgical conditions. For the treatment of these cases the author advises copious fluids containing glucose and sodium chloride. If these cannot be retained by mouth 0.9 per cent NaCl should be given intravenously. Results with this treatment were excellent.

Eleven cases of hyperpyrexia are described. Here again the impression was formed that a particular type of individual was most at risk—the obese man with a high blood pressure. Alcohol and sepsis were predisposing factors. In all cases there was prodromal malaise followed by an acute onset. The outstanding sign in the early stages was anhidrosis. In contrast to the usual description frequency of micturition was present in one case only. Delirium and coma followed in half the patients—those with a temperature of more than 108 F. Vomiting and convulsions were also common. The knee-jerks were invariably either diminished or lost. There was no suppression of urine. Chlorides were diminished in all cases examined. [Again no figures are given.] The treatment of these patients followed standard lines after reduction of body temperature by fans and iced water to 102–103 F they were transferred to an air conditioned ward at a temperature of about 75 F. In this environment a second cold sponging was never necessary whereas in an ordinary ward there is a constant danger of a recurrence of hyperpyrexia. For this reason the transition from air conditioned to ordinary ward should be gradual. Intravenous saline was not given as there were no signs of dehydration. Convulsions and venous congestion were treated by venesection. Mag. sulph. enemata were of value in controlling headache during convalescence. Lumbar puncture is not recommended as a routine measure in one fatal case the CSF was under pressure but otherwise normal. Two other patients died out of the 11 in the series.

The author recommends three sets of prophylactic measures

- 1 *Acclimatization*—Men arriving during the hot season should be protected from all avoidable stress e.g. at disembarkation.
- 2 *Air conditioning*—Cool rest rooms would prevent the cumulative effects of heat.
- 3 *Increasing salt and water intake*—The necessary amount of salt is put at $\frac{3}{4}$ –1 oz. per day and of water at 1–2 gallons per man per day. [It is doubtful whether these levels are high enough to provide a margin of safety in all cases.] It is recommended that salt (a mixture of NaCl and KCl in the proportions 3:2) should be added to drinking water—about 1 oz. of salt mixture to

five pints of water [The rationale of giving potassium in such large amounts is not clear since this cation is present in only low concentration in the extracellular body fluids and may act as a diuretic if given in large doses. In addition most animal and vegetable foods contain relatively large amounts of potassium but little sodium.]

The discussion that followed was opened by Col A. SACHS. He had noted that Indian troops were not immune to effects of heat and that though the incidence among them was lower than in European the case mortality was higher. In the Persia and Iraq Force it was found that men were kept fitter by making reveille an hour later and so giving them an hour's extra sleep. The output in workshops was not diminished although the working day was shortened. This is in contrast to the recommendations of Air Commodore MORTON who said that good results were obtained by adjusting working hours so that men started an hour earlier and stopped at 11.30 a.m. It is evident that this important question of the optimum hour of work in hot climates has not yet received a clear answer. Menten then made a type of case that has been called "subacute" and hyperpyrexia cases began with an apyrexial stage of indeterminate features and the patients later developed mental symptoms as worse than in acute heatstroke.

Col SACHS summarized the pathological findings in fatal cases of effects of heat. In hyperpyrexia there is a peripheral congestor and petechial haemorrhages in the trachea and beneath the serous membranes. There is a tenfold increase in the number of upper intestinal cells. There are haemorrhages and the heart contracted. Microscopically there were degenerative changes in the brain and coarse granular pyknosis throughout the organ. In the brain there is oedema perivascular and pericellular spaces. In some swollen and hyaline with many thrombosed capillaries in some treated cases there is a necrotic cellular content attributed to proliferation of new cells and macrophages. In the lungs there is haemorrhage and malarial to that of a fulminating pneumonia. It is suggested that there might be a relationship between the pathological changes and anaemia.

Most of the reticulated erythrocytes were red round to points acclimatized to the heat. Lt Col R. DREW stressed the importance of acclimatization and asked whether people lost less salt than after living in a hot climate. Dr W. S. S. LADELL said that a soldier burning the summer in Iraq the average daily salt requirement of the soldier was 0.25 per cent. This figure is in line with the requirements of the soldier in temperate areas. He said that the acclimatized soldier were acclimatized yet they were producing more heat than the same salt content as the unacclimatized soldier. He said that the acclimatized soldier had an earlier onset of heat than the unacclimatized soldier. Dr B. MCARDLE said that the acclimatized man began to sweat at a much smaller rate than the unacclimatized man. He also said that the acclimatized man expended less energy for a given amount of work. The blood flow to the skin as increased leading to a higher skin temperature and a greater rate of evaporation.

In discussing protection from heat Professor P A BURYON described topees spine pads and red shirts as superstitions and in contrast stressed the importance and practicability of air conditioned buildings. He pointed out the great danger in hot climates of excessive bandaging of surgical cases. Col S P JAMES asked whether the authorities had modified their views about sun helmets and spinal pads and whether these excellent precautions had been abandoned. He asked if it was now thought that a man could become immune to heatstroke by exposing his bare head and naked body to the Indian sun. Dr J WATERLOW said that in Iraq he had made some measurements of the area of the body shaded by the topee and found that at midday it was about 16 per cent. Most of the shaded area as well as the rest of the body was still receiving radiation from the surrounding desert at a surface temperature of 160 F.

Air Commodore MORTON in summing up recommended that topees should be worn in a climate such as that of Iraq but he did not think that spinal pads were necessary. He thought that thick boots tended to raise the body temperature.

[The discussion as a whole and the contradictory examples of personal and other experiences given in the course of it showed that there is still much divergence of opinion about the practical value of sun helmets and protective clothing.] *J Waterlow*

WOLIN J GOODMAN J I & KELLEY W C. Failure of the Sweat Mechanism in the Desert. Thermogenic Anhidrosis. *J Amer Med Ass* 1944 Feb 19 v 124 No 8 478-82 5 figs

The authors studied a syndrome involving failure of the normal sweat mechanism consequent on exposure to extreme heat. They believe the syndrome to differ from heat stroke and heat exhaustion. The patients were eight soldiers engaged in normal military training in the American desert area.

Typically there was a history of a rather sudden onset of generalized weakness subjective warmth and discomfort dizziness all in feeling headache and shakiness. These symptoms occurred during exposure to sunlight either with or without physical exertion. With the onset of these symptoms there was in each case a cessation of sweating and in several cases this was preceded by profuse sweating during a period varying from a few days to several weeks. In each case the cessation of sweating affected the body region below the neck while there was profuse sweating of the face and neck. From the neck downwards the skin was warm and dry and had the appearance of goose flesh. This papular eruption was not transient and in some of the cases of longer standing there was a fine desquamation. As the condition improved the skin resumed its normal appearance. Generally the mouth temperature was below 99 F except when the temperature of the environment was 120 F or more and then complaints of discomfort a feeling of extreme heat and irritability were offered. As a rule the patients responded readily to rest in a cool environment.

Areas on which sweating occurred were demonstrated by the starch iodine method. When cholinergic drugs (pilocarpine and mecholyl) were injected hypodermically the sweating response was parallel with that produced by exposure to heat—excessive sweating of neck and head and almost complete absence of sweating below the neck. When

the patient had recovered and sweated normally in response to heat they were again treated with meclothyl and they then showed a normal sweat pattern.

Detailed case reports are given. The hyperpyrexia, coma, rapid pulse and increased respiration rate associated with heat stroke were absent nor were the cold clammy skin and signs of shock typical of heat exhaustion present. During two months (July to September 1943) in the hospital there were 77 patients with some form of heat disorder and three of these were unquestionably cases of heat stroke. Many of the others had been evacuated before the syndrome of failure of sweating had been noted but it is thought that there must have been many other such cases besides the eight here reported.

All the subjects had previously been seen in battalion station and all were given salt therapy. It was only after the failure of this that they were admitted to hospital. It is thought that salt intake and excretion play at most an insignificant part. Laboratory data were obtained from 20 of the 77 patients admitted with heat disorders. Four of the eight patients with failure of sweating were included in this series and each of them had a normal blood chloride concentration as had all those with heat stroke or heat exhaustion.

The authors make the suggestion that the initial causes of sweating may perhaps be thought of as an overtaxing of the heat regulating mechanism to such an extent that a temporary functional paralysis is caused. They are inclined to the view that even after recovery the patients should not return to extremely hot climates. T. B. Lloyd

MILLER M. M. SILVERMAN J. J. & I. WELL V. E. Failure of the sweat Mechanism in the Desert. Correspondence. *J. Amer. Med. Ass.* 1944 Apr 15. 14 No 16 115.

BLANK H. Anhidrosis following Exposure to Extreme Heat. Correspondence. *Ibid.* 115 3.

The writers of these letters discuss the former paper by WOLKIN, GOODMAN and KELLEY. Miller remarks that anhidrosis is most frequently associated with chloride depletion and dehydration and says that since the major part of the sodium chloride content of the body is to be found in the extracellular fluid a considerable amount of chlorides can probably be lost without corresponding lowering of the blood chloride level. In his letter the organism tries to maintain WOLKIN and his colleagues apparently assume that a normal blood chloride level is sufficient to maintain that there was no chloride deficiency. But Miller points out that in one of the cases reported in their paper a satisfactory minimum replacement of the chloride loss (2000 cc. of 0.9 per cent solution in isotonic solution of sodium chloride) had been given and that this was followed by a prompt remission of all symptoms with a return to normal sweat function within 48 hours. All the patients were given 4-6 gm. of salt orally each day and also drinking water containing 0.1 per cent of sodium chloride but they failed to relieve the symptoms. Miller points out that most authors agree that such patients should receive at least 25 gm. of sodium chloride in the first 24 hours preferably a isotonic solution intravenously in addition to the oral intake and he adds that under desert conditions there seems to be a minimum requirement in cases of severe salt depletion.

Concerning the authors finding that following recovery of the sweating function the symptoms could not be provoked by temporary exposure to excessive heat Miller suggests that by that time their salt depletion and dehydration had been wholly or partially made good. The conclusion that salt is not indicated and is of no therapeutic value in such cases is described as a dangerous assumption.

Silverman and Powell feel that the syndrome described is fundamentally a psychosomatic phenomenon and that the inhibition of sweating is secondary. They mention that the anxiety state may during extreme elevations of temperature inhibit both palmar and general body sweating. They find the limitation of sweating to the face and neck difficult to explain but say that the possibility of local reflex action cannot be excluded. The symptoms described in the case reports—shaky and weak, head whirling, and so on—are said to be suggestive of a psychogenic factor. The operation of psychic influences would explain the absence of any disturbance in blood chlorides.

Blank refers to a case of this syndrome studied in Louisiana during the summer of 1943. This man presented a picture identical with that described by Wolkin and his colleagues. The local skin changes are emphasized. Besides the papular lesions which the authors describe this patient developed over the extensor surfaces of his limbs and on his trunk another distinct dermatosis. It consisted of superficial more or less circinate areas of slight erythema with moderate white scaling and mild pruritus. The scaling was patchy and similar to ichthyosis but was easily distinguished from congenital ichthyosis. About 20 other patients were seen for a skin disease identical in distribution, appearance and symptoms with that described. None of these patients as far as was known had experienced thermal anhidrosis but all had spent the summer in Louisiana and had been exposed to high temperatures. In each case a diagnosis of asteatosis was made and it was felt that the condition might be a late sequela of prickly heat. Relief was obtained by using plain greasy ointments.

T Bedford

BOOK REVIEWS

BERCOVITZ Z. Taylor [M.D. Ph.D. F.A.C.P. etc.] [Edited by]
Clinical Tropical Medicine. By Twenty Seven Authors. With a Foreword by Wilbur A. SAWYER M.D. Director International Health Division Rockefeller Foundation. pp. xvii + 957. 121 figs & 19 pls (5 coloured). 1944. New York & London. Paul B. Hoeber Inc. Medical Book Department of Harper & Brothers. [£3 10s.]

This beautifully produced volume is the work of 27 authors among whom are some of the most distinguished of American medical men. It is a textbook of clinical medicine as its title states and it is written throughout in plain easy style with a somewhat dogmatic trend which would be appreciated by the student new to the subject. There are sections on the diarrhoeal diseases, diseases caused by blood protozoa by spirochaetes and spirilla by Rickettsiae by viruses and by bacteria, nutritional diseases, diseases caused by yeasts and fungi, infections with helminths, tropical snakes and poisonous insects and the effects of heat, hygiene and sanitation.

An author who sets out to deal with clinical medicine may be justified in omitting more than can refer to epidemiology and the public health measures of control but in reading this book the reviewer was impressed with the superiority of this chapter in which more than curiosity reference had been made to these matters. Most medical men who work in the tropics feel the need of epidemiological instruction and indeed rely upon to advise on control and it is on this matter that they find the greatest difficulty in securing the compact yet sufficient material that could be given in a text book.

Nevertheless this book contains much that is valuable to the student and to the practitioner and the information for Modern advances in all branches of clinical medicine is referred to but the use of sulphatiazoles in plague deserve more favourable notice than is here given. No reference is made to DEBELL's recent work on *Dientamoeba* faecal in this Bulletin 1941 v. 38 4 in which he suggests that this protozoon is more able to the fly than to the amoebae. The clinical criteria of HEIBEIG and of GARDNER and VENKATRAMAN in the diagnosis of the cholera vibrio are not described nor is reference made to the different strains of the vibrio though these are important in the preparation of vaccines or to the El Tor and Celebes strains. Without this reference the reader would be under the impression that cholera is a simple disease than in fact it is.

The author of the chapter on malaria is critical of the short courses of treatment which have recently been in fashion with regard to quinine he says that its efficacy is undoubted if it is given over a sufficient period of time but that if given for a short time only it is ineffective that from 10 to 80 per cent of cases will relapse. In making this remark he does not differentiate between *P. vivax* and *P. falciparum* infections which is surely of first importance in the question of relapse. He advises a course of quinine lasting eight weeks. The dose of mepacrine recommended is 0.3 gm daily by mouth or for pernicious infections 0.1 to 0.2 gm daily by the intravenous route. No indication is given that the oral dose may be substantially increased during the first 24 or 48 hours with advantage especially in such hyperanaemic cases of *P. falciparum* infection as East and West Africa. The statement that a dosage of atabrine 0.1 gm three times weekly will keep the incidence of acute malaria at the minimum will not be acceptable to many military medical officers in hyperendemic zones. To this reviewer it seems that the treatment and suppression of malaria in subjects still too controversial to be at factorially disposed of so briefly as is here attempted.

Though in parts of this book the tendency to over simplification is evident there are other chapters which could hardly be bettered for instance that on yellow fever by SOPER and the section on helminths by SCOTT and BERCOVITZ (though the remark that sand filters if well managed make water practically safe from the cercariae of schistosomes may be disputed see WITENBERG and YOFFE this Bulletin 1939 v. 35 600). The remark in the section on heat cramps that it has been estimated that 1 gm of sodium chloride daily is necessary for those engaged in hard labour in hot weather seems to be inadequate when 10 gm or more are normally excreted daily in the urine and 10 gm may easily be lost in sweat in a hot country.

The book is printed on heavy art paper throughout and is illustrated by a series of superbly reproduced photographs.

Charles H. H. H. H.

CHESTLPMAN Clement C [OBE MD (Lond) MRCP DTM & H (Camb) etc] *Tropical Dispensary Handbook An Aid to the Training and Practice of Native Medical Assistants and for the Guidance of all engaged in Medical Practice in Rural Dispensaries in the Tropics* Fourth Edition Revised pp vi+299 19 pls (2 coloured) 1944 London & Redhill United Society for Christian Literature Lutterworth Press [10s]

The teaching of medicine is notoriously difficult and like the teacher of medicine the writer of a text book is faced with the problem of what to leave out bearing in mind the educational standard of the persons for whom the book is intended. This book was written for the use of native dispensers and assumes that they have already received instruction in anatomy and physiology. It is not concerned with hygiene nursing maternity and infant welfare since suitable text books on these subjects already exist. The author makes the point that more and more use is being made of native dispensers throughout the tropics and there is therefore urgent need to ensure that the teaching of these dispensers is adequate to their needs. His book is intended for use in addition to the lectures of any course of instruction and as a reference book to which the dispenser can turn at need. That the fourth edition has been called for is a sign that the author has succeeded in his object and no doubt his experience in the training of dispensers has given him a clear conception of their needs and capacities.

The information given is accurate and concise. In this edition only essential new matter has been incorporated for instance the sulphonamide treatment of plague the use of gentian violet for *Enterobius* infections and the treatment of sleeping sickness with the aromatic diamidines are referred to. Criticism may be made of minor points. On page 115 no mention is made of lean meat (as distinct from animal fat) as a source of vitamins or of palm oil as a source of vitamin A. On page 81 it is stated that various vaccines are used for the prevention of bacillary dysentery. On page 46 Brill's disease is used as a synonym for murine typhus. But these are minor points which would not seriously affect the student.

The author might however consider the suggestion that for the full appreciation of the relationship of man to the parasites of disease which would probably go far towards digesting in the student's mind a mass of apparently unrelated facts sections could be added on the biological position and features of bacteria protozoa and the worms and on the modes of transmission of the diseases in nature. It is true that much of this information is contained in various parts of the book but it is the reviewer's opinion that an organized introduction on these lines would give the pupil a most helpful start to his lectures and reading. In the section on inflammation in general the author has in fact given an introduction to the surgical diseases which forms a basis comparable in its way to that now suggested.

The *Tropical Dispensary Handbook* covers the fevers (including the tropical fevers) diseases of the various systems helminthic and deficiency diseases skin diseases and miscellaneous disorders inflammation wounds injuries and surgical diseases with a chapter on the eye and one on minor surgery. There is a section on pharmacology and one on laboratory notes. It may be confidently recommended to those who undertake the important work of instructing native dispensers it can be relied upon to cover the ground thoroughly and to find perhaps its greatest use as a book of reference to the dispensers working after qualification in their own districts.

Charles H ilcocks

BIRAUD YVES [M.S. M.D. M.P.H.] Polyglot Glossary of Communicable Diseases Contribution to the International Nomenclature of Diseases Reprinted from *Bill Health Organisation* (League of Nations) 1943-44 v. 10 No 3 207-556 [Published by Allen & Unwin (League of Nations Publications Dept.) 40 Museum Street W.C.1. [4s.] [Review appeared in *Bulletin of Hygiene*]

Names of diseases in different languages often present sufficient resemblance to facilitate their translation from one language to another but there are instances of words identical or nearly identical in form having been used in different countries to name diseases that are not the same. This is but one of the drawbacks of a nomenclature that has been allowed to grow without recognised rules until it has become many times greater and much more confused than it should be.

Dr Yves Biraud, Head of the Service of Epidemiological Intelligence and Public Health Statistics of the League of Nations, having experienced the difficulties of interpreting the national terms for diseases has compiled for the help of others a most useful polyglot glossary of the names of communicable diseases as found in official publications, medical literature and common speech in 24 European languages.

In this 250-paged glossary he gives in a series of parallel columns first the standard French nomenclature of the Detailed International List of Causes of Death (1938), then the corresponding Latin terms, after which come columns with the German, English, Bulgarian, Danish and Norwegian, Spanish, Estonian, Finnish, French, Greek, Hungarian, Icelandic, Italian, Latvian, Lithuanian, Dutch, Polish, Portuguese, Roumanian, Russian, Serbo-Croatian, Swedish, Czech and Turkish equivalent.

The glossary, which forms Part II of the compilation, is preceded by an Introductory Note and by a detailed description and explanation of the glossary and of how it should be used. Some guidance is here given on transliteration from Slav and other languages and a table is reproduced to help readers to decipher and transliterate symbols derived from the Cyrillic alphabet into Latin characters. A full alphabetical index forms Part III of the work. Part IV contains tables showing the correspondence between the content of the headings in the Detailed International List of 1938—on which this glossary is based—and the Intermediate and Abridged Lists of that same year and also the correspondence between the 1938 International Lists and the Detailed Intermediate and Abridged Lists of 1929 to enable users to know what diseases are covered by the heading of all statistics based on the International Lists for the period 1931-1939.

The work reveals the need both for unifying the medical terms used in the different countries and for defining their meaning and demonstrates that some form of international agreement on the nomenclature of diseases is long overdue.

Dr Biraud modestly apologises for any possible gaps and errors in this valuable glossary, explaining that circumstances did not allow of the sending of questionnaire forms to medical authorities of the various countries represented or of submitting proofs to them for correction. The reviewer has noted only one error in the Glossary where *Malaria* is entered under the heading 47(1) as a *de* *da* to helminths and the other in the Alphabet I in which under the entry

Maladie d'un jeune pour hirs *Meningitis serosa pericranii* and *Schizonehute kankri* the reader are referred to heading 35(f) in the Glossary but will find no corresponding entries at that place.

R. L. Stepp, rd

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[No 10

MEDICAL ORGANIZATION AND DISEASES OF THAILAND

BEFORE THE JAPANESE INVASION

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MEDICAL ORGANIZATION

The health organization of Thailand has been centralized since 1918 in the Public Health Department of the Ministry of the Interior with a Director General at its head. There are two bodies the Health and the Medical Councils. The Health Council is composed of representatives of the Public Health Department the Army and Navy the Siamese Red Cross the International Division of the Rockefeller Foundation the American Presbyterian Mission and other bodies. Its function is advisory. The Medical Council controls the activities of medical men and institutions.

In Thailand the medical missions and the Siamese Red Cross institutions are very active and are supported by grants from the Government. The American Presbyterian mission has been established in the country for more than 100 years and has created 11 general hospitals (for instance those at Chiangrai Chiangmai Prae and Nan) and two leper asylums. The Government however controls medical institutions apart from these and has made plans for an extensive medical service throughout the country. Siam is to be divided into four health divisions in the North East Centre and South each of which is to have a central hospital of 200 beds with laboratories and facilities for the training of subordinate staff. In the important provincial centres there are to be second grade hospitals of 100 beds and in more remote districts smaller hospitals and dispensaries are to be instituted. These plans are for the future at present they are far from realization. In Bangkok there are two large modern hospitals the King Chulalongkorn and the Siriraj accommodating 600 patients. At these are the schools from which medical men graduate after a course lasting 5 years. There is a Pasteur Institute and there are three laboratories the Government laboratory of the Ministry of Commerce the laboratory of the Medical

Officer of Bangkok and the laboratory of the Siamese Red Cross. In the provinces there are a few small Government hospital and dispensaries exist in the smaller centres for instance in Lampang and Nan.

In the whole country for a population of 13 000 000 there are about 500 qualified medical men of these all except about 40 received their medical education at the only institution in Bangkok mentioned above. They are mainly employed by the civil services the Army and the Red Cross only 2 per cent are in private practice. More than half of the qualified medical practitioners live in Bangkok. It is therefore evident that for the rest of the country the medical services are inadequate.

There is an old tradition of Siamese medicine of which practitioners still exist in considerable number and the Government does not hesitate to take advantage of the services of the more reputable exponents of this ancient art but there are charlatans in this as in other traditional communities. Gradually however the trained dispensers and sanitary inspectors (of whom there were 170 in 1931) will replace the practitioners of traditional medicine. But in rural Siam modern medicine is little known and is expensive so that there is little demand for it by the naturally suspicious people and such demand as there is is somewhat ineffective. It is not doubted however that the value of western medicine will be appreciated in due course.

Local authorities of the commune and larger unit are permitted to promote their own health work but few as yet afford to employ expert. Nevertheless good work is being done and these subordinate commune officers for instance carry out vaccination against smallpox. There are 67 first grade health units under the control of medical officers and 66 second grade units under the control of medical assistants. There are also 10 mobile units. The Army cooperates in the training of medical assistants and doctors trained during military service in the health organizations on discharge are encouraged to settle in the villages.

Hospital nurses are trained in the various Government and Mission hospitals and health nurseries and trained though on a smaller scale. Midwives are difficult. In rural areas they are ignorant and harmful. Training is scarce and organized but the result was to drive all those who qualified into the towns. An attempt is now being made to attach a nurse midwife to each health centre.

Education was made compulsory in Siam more than 20 years ago and the Public Health Department has taken advantage of this fact to introduce medical education into the schools where the children are taught the elements of hygiene. The effort does not however end there and the department has carried out health campaigns aimed at the instruction of adults by means of booklets lecture exhibitions and demonstrations. One such for instance was held during a plenary session to Pra Pathom. The Government also attempts to improve the public health by extension of economic progress and rural reconstruction through co-operative credit societies.

There have been two extensive rural health surveys notably one made under the auspices of the Rockefeller Foundation. These have focused attention on the diseases of importance in the country.

Certain diseases are notifiable—plague cholera smallpox cerebrospinal fever and (though it has not yet been reported anywhere in the far east) yellow fever. Other diseases may be made notifiable as conditions may demand.

INSECT BORNE DISEASES

Malaria—As in other far eastern countries malaria is responsible for more sickness in Thailand than any other single disease but it is quite impossible to give even an approximate figure of the number of cases which occur. The accurate diagnosis of malaria depends upon careful and expert examination of the blood which is a procedure impossible to any but highly trained microscopists and as has been made clear in the previous section the number of trained men is wholly inadequate to serve the needs of the general rural population. It has been estimated that there are about 35 000 deaths each year from malaria but since most of the death returns are made by village head men they cannot be regarded as accurate.

In the Public Health department there is a section devoted to the control of malaria and there have in the past been several surveys of the country in which British workers have played a notable part. The disease is not evenly spread throughout Siam it is intense in the north and the south where the country is hilly and the streams are perennial it is much less intense though present in certain areas in the centre and east where the country is dry for several months of the year and where the water is too muddy for the development of the vector mosquitoes.

In the central plain in spite of the fact that there is a lengthy wet season from July to December the average rainfall is only about 1 000 mm in the year and this is found to be insufficient to support extensive rice cultivation. To overcome this difficulty use is made of irrigation an art which has been practised by the Siamese for centuries. The water for these irrigation works is drawn from the rivers which towards the south are influenced by tidal movements and which are largely used as traffic waterways. These movements provide a constant flushing motion which destroys mosquito larvae. In addition the slow movement of the river water along the flat plains brings down masses of silt which is maintained long in suspension and which is thought to be inimical to the breeding of those anopheline mosquitoes which are efficient carriers of malaria.

In Bangkok malaria is not common though *Anopheles barbirostris* and *A. hyrcanus* are ubiquitous and *A. vagus*, *A. tessellatus* and *A. subpictus* var. *malayensis* are found. *A. barbirostris* and *A. vagus* breed in the blind ends of waterways. None of these mosquitoes however is here a potent vector. There is malaria in some of the villages outside Bangkok and *A. aconitus* is found after the rains. It is known as a good vector in Malaya. *A. annularis* a poor vector is also found.

As the plain rises to the foothills to the north and east the character of the rivers changes and clear mountain streams which form ideal breeding places for dangerous species of *Anopheles* are found in abundance. Here in the north north east and east are found *A. fluviatilis*, *A. minimus*, *A. culicifacies* and more rarely *A. maculatus* all potent vectors of malaria. In addition *A. vagus*, *A. barbirostris* and *A. philippinensis* are present but are not of much importance. In these parts where the economic status of the population is low malaria is intense and spleen rates of 80 to 96 per cent are recorded. Benign tertian subtertian and more rarely quartan forms are found and the grave sequel of subtertian malaria blackwater fever is not uncommon. In Korat in 1912 there was an outbreak of blackwater in a non immune labour force introduced to build a railway.

It is a matter for speculation how far the poverty of the natives affects their reactions to malaria but it is a common opinion elsewhere that improvement in nutrition materially offsets the ill effects of the disease.

In the low coastal zone of southern Thailand the intensity of malaria varies greatly. In the province of Nakhon Srimarat on the east coast and on the Nakhon plain there is little and the spleen rate is only 6.5 in spite of the fact that the brackish water breeder *A. sundaricus* (*A. ludlowi*) a known vector is found along with *A. fukuensis*, *A. hyrcanus* and *A. is* species of less importance. In the province of Satun on the other hand malaria is intense and is carried by *A. ludlowi* and by the species which breed in the hill streams of which *A. sinuatus* and *A. niger* are the chief. The spleen rate here is 86%. In the hills it is found that *A. aotus* is associated in Satun with a spleen rate of 16.6.

In places where malaria is intense there is usually a high infant mortality from the disease. Children who survive go through a long period of ill health but gradually acquire immunity so that in adult life they are, though continuously infected, show little sign of physical impairment. The Japanese Government is alive to the fact of this high infant mortality. It is fully realized that the most satisfactory method for malaria control would be the elimination of the dangerous species of mosquito but in these rural areas this is not yet possible. In the meantime the Government has made available to the people large quantities of quinine which is either sold below cost price or is given free to patients and others may be tided over the attacks which might otherwise prove fatal and be enabled to develop their immunity.

At the present time in areas in which malaria is not so intense remain susceptible to attacks of the disease when infection is possible and that attacks occur usually during or after the rains when the mosquito population is increased. The natives of the central plain are in this position and since there is considerable poverty there and a tendency to migration has been noticed such natives as move to more malarious areas will provide a problem in public health. They will form a non-immune population in a heavily infected area and will be subject to long periods of severe attacks. Fatal infections may be expected.

Control of malaria in the hills can be effective only when supervision of the many necessary operations is close. This is at present not possible in the rural districts so that the best that can yet be expected is that death may be averted by the administration of quinine and immunity gradually acquired. For Europeans precautions should be taken such as the use of carefully kept mosquito nets, mosquito-proofed houses, mosquito boots and prophylactic drugs and mosquito breed should be prevented within at least 1 mile of habitations. The control of breeding includes such measures as the draining and periodical flushing of streams, the treatment with antilarval oils or Paris green and the draining of pools of water but for the details of these measures experts versed in the local conditions should be consulted.

Deer is a fever which though acute and painful is in itself trivial in that the mortality is almost nil. It may however sweep over a district in epidemic fashion and cause extensive interference with normal life for a short period. An epidemic was reported in Ban Lok in 1901 in which 70 per cent of the population were attacked but in which no deaths were recorded. One American writer states that it is

epidemic in Bangkok every year and plays havoc with the Europeans though the natives do not seem to suffer so much from it. It is conveyed from man to man by the mosquito *Aedes aegypti* which is found extensively in the Far East especially in coastal areas. This mosquito is also in other parts of the world the carrier of yellow fever so that it may be certainly stated that were yellow fever to be introduced into these countries its spread by this mosquito would be inevitable. *Aedes aegypti* breeds commonly in domestic collections of water especially in water butts jars and cisterns and it is a general custom for the Siamese to keep water in such receptacles.

With the development of air travel it is possible that mosquitoes infected with yellow fever or persons in the incubation (and infective) stage of the disease may be transported from Africa to India and the Far East to initiate epidemics in those countries and for this reason the authorities should be vigilant in the supervision of aircraft and travellers. The measures in force in India and other countries are well known to health authorities to be effective they require the whole hearted support of the administrative services.

Dengue therefore may be taken as a pointer to the possible danger of yellow fever. It should be borne in mind in the diagnosis of fevers in Thailand.

Sandfly fever another trivial disease has been reported as not uncommon in Bangkok.

Plague is essentially a disease of rodents particularly in the Far East of rats. It is closely associated with grain stores in which rats find food and harbourage and therefore with ports and ships and it is largely carried along trade routes.

Plague was imported into Bangkok in 1904 probably from Bombay. Since then there have been cases in Bangkok every year and in the 17 years 1905-1922 there were discovered 1 722 cases. These figures do not indicate a serious position and are not unlike those reported from Singapore and Saigon. Yet in Bangkok rat harbourages are plentiful especially in the old buildings whose floors are slightly raised from the ground. The explanation of the relatively low incidence of plague under these circumstances may lie in the fact that the rat most commonly found in Bangkok is *Rattus norvegicus* whose contact with man is never so close as that of *R. rattus*.

In other parts of the country plague has appeared in epidemic form chiefly in the season from November to April especially in the market towns and villages in which storehouses offer conditions suitable to rats for instance at Phra Pathom in 1907. In Korat there was a devastating outbreak in 1917-18 during which 10 per cent of the population died of the disease. Energetic measures however were taken and since then there has been no major epidemic in that town. In spite of these recurring outbreaks in isolated places which are overcrowded and insanitary plague has not proved to be a major problem and this again may be due to the species of rat most commonly found. It has been claimed that the rat trapping and poisoning campaigns and the education of the people in the construction of rat proof buildings and in the proper disposal of refuse and the storage of food have helped to reduce the incidence but these measures can hardly have been so completely undertaken throughout the country as to have made any decisive reduction in the rat population. They indicate however an understanding of the correct solution of the problem. No epidemic of pneumonic plague a form transmitted from man to man

directly has been reported the majority of cases have been of the typhonic type. In 1937 it was stated that no cases of any kind had been reported since 1934 but there was a considerable outbreak in several parts of the country in 1938-40.

Typhus—No record of diseases of the typhus group in Thailand has been seen but since it is known that louse borne and mite borne typhus are found in Indo China and flea borne and mite borne in British Malaya it would be surprising if Thailand were completely free. It is probable however that none of these varieties is a major problem there but the possibility of their appearance should be borne in mind. If a louse borne typhus contracted from rat flea and mite borne typhus (tsutsu-mushi disease) from the mites which abound in bush country or the cleared areas this disease may be a serious menace to troops operating in bush country. The louse borne form may be associated with louse borne relapsing fever (see below).

Leishmaniasis—Reports of the infection are conflicting. One author states that he has seen in Ban Kok a case of kala-azar in a native who had never left the country but a later writer failed to find it there in spite of searching. The first worker also states that *Leishmania tropica* may be found in 2 per cent of all ulcers seen in Ban Kok.

Relapsing fever has been found in Ban Kok though very rarely. The vector is probably the louse.

Rat bite fever though not a disease carried by insects may be referred to here since the causative organism is of the same group as that of relapsing fever. Cases have been seen in Bangkok. Though not commonly found this disease should be remembered as a possible diagnosis.

NUTRITION

It is stated that in Thailand foodstuffs are produced plentifully and are exported but there is nevertheless poverty among the peasants of the north and food deficiency diseases are by no means uncommon. The principal article of diet is rice which is largely cultivated throughout the country in the hills as well as in the great plain. The danger of a diet of rice lies in the fact that in the process of husking by mechanical means certain parts of the grain which contain vitamin B₁ are removed. The result is that the grain left for food known as polished rice though easy to digest and pleasant to look at is inadequate alone to maintain good health. Unfortunately this method of preparation is cheap and convenient and the finished product has its attraction. It is also the custom of Europeans to use only polished rice which has become therefore a mark of some distinction to be used as much as possible by the natives who imitate the habits of the whites. Europeans however take so varied a diet that vitamin B₁ is consumed in sufficient quantity in the other articles of diet but for many Siamese natives rice is not only the staple but is also almost the only food. Fortunately in some of the districts where this is so machine milled rice is not in such common use and the hand milled rice retains the vitamin but there are parts of the country where the effects of the consumption of a diet mainly of polished rice are shown by the relatively high incidence of beriberi. This disease causes many deaths and much disablement. In Indo-China it stands high as a cause of ill health and though the records in Thailand are not so complete as those of Indo-China it is known to be common there also. In a recent report

however it is stated that the incidence of beriberi is not so great as it once was because the use of polished rice is diminishing

There are of course many additional foods in various parts of the country. Fish is largely eaten along the coast and in some rural districts. Salted fish is exported from coastal areas. Animals are not slaughtered by the country people except in unusual circumstances but in Bangkok where meat is eaten in large quantity slaughter is carried out under good conditions in a well equipped abattoir. Pork is a food used by a proportion of the more wealthy natives and chickens and eggs are sometimes eaten. Vegetables and fruits are available in many places the coconut and the sugar cane are cultivated.

But in the main the natives are ignorant of food values. There is little production of milk and the maintenance of cattle for food is not common. The lack of animal protein in the diet is a matter to be remedied by education and by an extensive campaign by the veterinary department.

Beriberi is not the only deficiency disease seen in Thailand though it is the most important. There have been reports of pellagra and of a high incidence of stone in the urinary tract. McCarrison in India has put forward the view that the latter may be due to lack of vitamin A.

WATER SUPPLIES SANITATION AND HOUSING

As in most eastern countries the water supplies of rural Thailand are open to continual gross contamination. In the country districts water for all purposes is taken from shallow wells ill constructed and badly kept and from streams rivers and canals which are polluted by the household refuse of the inhabitants of their banks. It is stated however that in some places temporary wells are dug close to river banks so that there may be some protection of the water by the process of filtration through the soil. How far this protection can be effective depends upon the manner in which such wells are treated. If the sides are loose and if the natives walk into the water or dip into it their contaminated jars as is usual in many countries pollution is inevitable.

The proper construction of wells is a matter in which the Government takes an active interest and grants are made for this purpose while supervision is exercised by the sanitary authorities.

Rain water is largely used in rural areas and is probably the safest supply. The difficulty is in storage which is usually insufficient for the quantity required. Large jars are made for this purpose but it should be remembered that *Aedes aegypti* the mosquito responsible for the spread in Thailand of dengue and in other countries of yellow fever breeds in such domestic water collections.

In the dry seasons of past years cholera has appeared in the riparian populations possibly conveyed in the river water possibly in water from the overworked and badly kept wells along their banks. During these outbreaks the Government has adopted the measure of providing galvanized iron tanks in which water is stored after having been cleared with alum and chlorinated. These temporary expedients have however indicated the possibility of providing good supplies in populous districts by some such means.

In Bangkok the position is different. Here there is an excellent piped supply to the eastern part of the city drawn from the river

Chao Phya 40 kilometres to the north and cleared by coagulation sedimented and filtered by modern plant. Fountains for public use are provided from this supply but the natives in parts of the city still use the numerous *khlongs* or canals for all purposes though the water in these is so polluted that it may be regarded as dilute sewage. In western Bangkok rain water is stored in jars which again form the breeding places of *Aedes aegypti*.

As regards the quality of the water throughout the country little information has been seen but one medical writer notes that goitre is fairly common in some districts and it is known that elsewhere in the world this condition associated with lack of iodine in the water.

Bound up with the question of water supplies is that of sanitation and the disposal of excreta. In general the Siamese take no care to dispose of excreta in a safe manner and indiscriminate defaecation is the rule. Under the guidance of the sanitary authorities however proper latrines are being constructed and a type of precast cesspit is becoming popular. It may be noted that animal dung is not much used as manure though the agricultural department is urging its use. To explain to natives that human excreta are dangerous and that animal excreta are helpful needs a nice discrimination of reasoning to arrive at a conclusion.

Houses in Thailand are usually built so that the floor is raised from the ground on poles. The space beneath the floor an obvious place for rubbish provides ideal harbourage for rats and the thatch in common use for roofing offers shelter for climbing rats. The use of corrugated iron sheets and tiles however is increasing.

INTESTINAL DISEASES

Cholera is usually a water borne disease and its propagation therefore depends largely on the faulty protection of water supplies and the pollution of these supplies by human excreta. This may take place by the passage of faeces directly into the water as may happen in rivers in which people bathe or by defaecation in the immediate neighbourhood of wells or by the washing of contaminated clothing in water used for drinking. Contamination by flies is also a method of spread. As a rule the organisms of cholera are excreted by persons in the active stage of the disease or in early convalescence only.

Cholera is usually prevalent in central Thailand during the dry months of the year but the outbreaks are generally small. It is only occasionally that epidemic conditions occur. Central Thailand is well watered by several large rivers and is intersected by numerous canals and for the reasons given above the natives are liable to water borne infections. Cases are found in the villages every year and the infection is presumably carried from season to season among the Siamese themselves but there is a report that the most recent severe outbreak was introduced from Burma. This presumably refers to the epidemic which became evident in 1936. In Bangkok the incidence fell from 2193 cases in 1936 to 1 in 1934 and rose to 580 in 1936 and 1801 in 1937. The severity of the disease is indicated by a death rate of 51.64 per cent of the cases in 1937. It is known that at this time the incidence was also heavy in the provinces of the central plain and along the east coast of southern Thailand and that for the whole country in 1936 and 1937 almost 10,000 cases were reported. Since notification cannot be complete it is beyond doubt that the actual incidence was greater.

Control of cholera is attempted in a number of ways. Firstly by education of the public in the care of drinking water and by the use of disinfecting chemicals during epidemics. Secondly by the provision of clean temporary supplies at suitable river centres during epidemics. boats are used to carry this water. Thirdly by the care of food and markets and the supervision of vendors. Fourthly by instruction as to the danger of flies and of the consumption of uncooked food and finally by mass inoculation of the population with anti cholera vaccine. This is a big programme of which one ultimate aim is the provision of pure water supplies in rural areas and its progress towards realization cannot be rapid. Controlled water supplies are expensive and must be constantly supervised by experts and the value of protective inoculation is limited partly because the protection afforded is relatively transient. But the efforts are being made and for the moment the long view must be taken.

Fevers of the typhoid group are reported from Bangkok and are no doubt common enough in the rest of the country. The diseases are most prevalent from July to December and the rainy season extends from May to October. It has been suggested by one writer that during the rains contaminated material is washed from the ground surface into the canals and that rain water is contaminated during the process of collection. Milk supplies are usually grossly contaminated and carriage of infection by flies which abound is probable.

Nevertheless it has been stated that these diseases are not seen in the natives so frequently as would be supposed and that it is in the Europeans that the incidence is relatively most heavy. An explanation of this may be that the natives have acquired immunity through long contact with the causative organisms.

Dysentery is common. Both the amoebic and the bacillary forms are seen and it is said that the former is the more frequent. But it is doubtful if more than a fraction of the cases of bacillary dysentery are diagnosed since it is so often a fatal infection especially in children and it is probable that the majority are not seen by qualified medical men. In spite of the reported frequency of amoebic dysentery liver abscess a well known sequel is comparatively rare. A similar low incidence of liver abscess is reported in Indo China.

OTHER DISEASES

In Thailand *hookworm infection* is widespread but it is stated that it is nowhere intense enough to be a serious menace. In 1917 a campaign was undertaken by the Rockefeller Foundation in association with the Red Cross Society for the control of the disease. This lasted for six years and the measures inaugurated were then taken over by the Public Health Department. These consist largely of the education of the people in the principles of sanitation and the construction of safe latrines and it is now stated that the disease is under effective control though in the remote districts the native sanitary habits are probably still primitive.

There are other intestinal worms which are common in Indo China and no doubt also in Thailand though records have not been seen. They are not of great importance.

Filariasis is common in Thailand.

In a recent report a number of infections with *Gnatostoma spinigerum* are recorded. This is not of much importance but should be remembered.

as a possibility in diagnosis it causes subcutaneous nodules to the size of a bean.

Leprosy is common. After a survey in 1937 it was stated that 16 893 cases were known but in another report the incidence is estimated at between 20 000 and 50 000. The distribution appears to be fairly even throughout the country though in the survey 7 041 were reported from the north-eastern area alone.

The American Presbyterian Mission has established two leper colonies, one in the north at Chien-mai and one in the south at Sridharmaraj, each colony receiving a Government grant. The Government has also established one centre at Bhuket in the south, one near the capital at Phra Pradaen, and another institution in the east. These five centres have provision for 1 000 patients, but there are also in the north and north-east certain leper communities which have grown up partly owing to administrative action and partly owing to local native custom. These however are rudimentary. It is thus evident that the majority of lepers are not under effective control and to increase control efforts are made to provide units throughout the country whose function it will be to give treatment in the native villages. Leprosy remains one of the major medical problems.

Scarves are common especially in children and young adults. It is especially common in the east and in some parts of the south of Thailand.

Veneral diseases are widespread. *Syphilis* is rampant but as in many other tropical countries the late nervous complications are rarely seen. It may be taken as true that syphilis is a potent cause of infant deaths. *Gonorrhoea* also common and there is a report of the occurrence of *limatic bi bo* (lymphogranuloma in unale) though it is stated that in these cases there is sometimes no history of sexual contact.

Tuberculosis is estimated to account for more than 10 000 deaths each year and the common pulmonary form is a very fatal affection of the Siamese. It is most common in urban centres, here overcrowding exists and close contact is inevitable but is also found in rural areas. In the towns it is especially seen in the Chinese who live under very crowded conditions.

There exists an anti-tuberculosis association which encourages public education and at Ban Kok there is a centre and hospital for free examination and treatment. Other centres are proposed for the provinces.

Tuberculosis is a major problem and it is probable that the incidence is increasing.

Smallpox has broken out in Thailand from time to time in past years as it has in all the far-eastern countries but of late there has been no serious epidemic. Figures for the whole country have not been seen but in Ban Kok the number of known cases in 1926 was 251 at the end of the great epidemic which spread over the whole of the far east—India, China, Japan and Thailand—in 1924-25. In 1927 there were 90 cases but from then to 1937 the annual numbers were below 10.

Vaccination was introduced by American missionaries in 1840-41 and a vaccine laboratory was established in Ban Kok in 1903-04 and later transferred to Nara Pathom. Vaccination against smallpox is now compulsory for the whole population and for immigrants and it is stated that over 80 per cent of the population have been vaccinated and that the proportion is increasing. Practitioners in the districts are

paid by results and the lymph is supplied free of charge so that there is an incentive for them to encourage vaccination. The usual precautions against the introduction of the disease from overseas are taken at the ports.

Of the diseases which commonly occur in temperate climates *pneumonia* is a relatively common cause of death. It does not occur in epidemic form but is constantly found. *Cerebrospinal meningitis* has been reported from prisons and barracks. *Diphtheria* is said to be increasing and *measles* is common in Bangkok. *Mumps* is reported. *Influenza* has occurred in epidemic form particularly during the world pandemic of 1918-19. Of the eye diseases *trachoma* is common. *Cataract* is also common.

Rabies is rare but does occur. It is found in pariah dogs and transmitted to man by bite. There is a Pasteur institute at Bangkok at which treatment may be given.

Tetanus though not often seen in adults is a common affliction of new born infants and is contracted by them as a result of ignorance of the necessity for cleanliness in the treatment of the stump of the umbilical cord. It is here that the lack of competent midwives and physicians is evident. A few years ago there was an average of one case a day at the French hospital in Bangkok and the cases were invariably fatal. Most of the infants were Chinese.

Other causes of infant mortality are diarrhoea and wasting diseases for which the comprehensive native name *Sang* is used. It was estimated that in 1917 the infant mortality rate for Bangkok was over 300 per 1 000 per annum and for this excessive rate blame was chiefly laid on the bad traditions of midwifery which obtained.

Drug addiction is not a problem in the rural population. The smoking of opium is mainly confined to the urban populations especially the Chinese. The smoking of hemp is prohibited and the Government has complete control over the import manufacture sale and use of drugs. It is therefore considered that no action other than education is needed to keep drug addiction within bounds.

Cancer is fairly commonly seen especially of the mouth and the view has been expressed that this arises largely from the native habit of betel chewing.

Lead poisoning has been reported in people coming to hospital in Bangkok from a part of the country where there are large deposits of lead and where the water contains a high proportion of the metal in solution. They show all the usual signs except the blue line on the gums which cannot be seen on account of the discolouration caused by betel chewing.

Snake bite is quite common. Mention is particularly made of the king cobra (*Naja hannah*) whose bite is particularly fatal but the cobra *Naja naja* and the krait *Bungarus fasciatus* are doubtless found with the daboia *Vipera russelli* and others of the same family. The venoms of all these snakes are highly poisonous. In Bangkok there is an institution at which antitoxic serum for the treatment of snake bite is prepared.

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SUMMARY OF RECENT ABSTRACTS

VIII TYPHUS GROUP OF FEVERS

General

FELIX (p 230) provisionally classes the fevers of the typhus group according to the response to the Weil-Felix reaction in Type *Proteus* O19 Type *Proteus* O14 Type undetermined. These correspond with the following vectors: lice and rat fleas, mites, ticks, and (exceptionally in South Africa) lice and rat fleas. The various local names are also given. The serological classification of the third group is left further investigation. The antigenic structure of the rickettsiae other than *R. febrilis* has not been studied at the time Felix wrote, but the discovery of the volk sac and animal lung methods of cultivation will probably lead to advances in knowledge of this kind. In comment MORGAN refers to the value of a classification by vector from the clinical and epidemiological points of view, though for the causal organisms a classification based on antigenic type will undoubtedly be adopted.

PINKERTON (p 25) in a critical analysis of the literature on the pathogenic rickettsiae suggests that because of certain morphological and other characters, those of the tick-borne group should be classed in the separate genus *Dermacentroxenus*. In comment MORGAN disputes the wisdom of this suggestion in view of the great similarity between the clinical and pathological effect produced by all these organisms. The organism of boutonneuse fever is differentiated by Pinkerton from that of Rocky Mountain fever because of certain immunological differences, but is probably the same as that of African tick bite fever. The name *D. rickettsii* var. *concolor* has been suggested. The organism of murine typhus is regarded as a variant (*morseri*) of *Rickettsia prowazekii*. PHILIP (p 825) discusses the nomenclature of the pathogenic rickettsiae and proposes to retain the generic name *Dermacentroxenus*.

The information from which these summaries has been compiled is given in the abstract which has appeared in the Tropical Diseases Bulletin 1943 v 40. References to the abstracts given in the names of the authors are given, and the pages within the abstract printed.

and to create a new genus (*Coxiella*) for the organism of Q fever. In comment MEGAW argues in favour of the retention of the generic name *Rickettsia* throughout.

CASTANEDA (p 127) from his experience in Mexico thinks that there are types of rickettsiae which vary in a whole range between the classical and murine types and that there is no essential difference between these types. The striking differences observed in the animal reactions can be explained on the hypothesis that murine strains become modified after a number of passages through man. He reports that from horses infected with a murine strain a serum has been prepared which is about 16 times as potent as human convalescent serum. The murine strain also lends itself more readily than the human to the preparation of vaccines. He classifies fevers of the typhus group into four sections which are essentially (1) Those transmitted by ticks (except Q fever) (2) Those transmitted by lice and fleas (3) The mite borne group (4) Q fever and he holds that the immunological relationships between these are much closer than is usually recognized giving examples in support of his views.

GEAR (p 591) discusses the typhus fevers of South Africa and gives a table of fevers of this group in which the diseases are differentiated according to vector. The head louse is regarded as an effective vector of epidemic typhus. BURNET (p 234) gives an account of the rickettsial diseases of Australia. louse borne typhus does not occur murine typhus is rare tsutsugamushi disease is found in northern Queensland and Q fever has recently attracted considerable attention.

PLOTZ *et al* (p 685) describe the morphological appearances of the rickettsiae of epidemic typhus endemic typhus Rocky Mountain fever and Q fever as revealed by the electron microscope. In spite of great variations in all four types the basic structure is the same in all. SIKORA (p 763) has made a morphological study of rickettsiae by intensive staining and ordinary microscopy at a magnification of 3 000 diameters. In comment MEGAW criticizes the claims for accuracy at such magnifications.

GIPOUD and PANTHIER (p 764) claim that different structural phases of rickettsiae represent the result of different types of reaction of the host to the invading parasite. Bacilli-form rickettsiae are the actively reproducing and highly pathogenic forms granular clumps are found when the host is putting up resistance but these forms may give rise to bacilli-form types on passage through animals.

POMALES LEBRÓN and MORALES OTERO (p 528) have compared 72 strains of *Proteus* A organisms in the United States all except 5 were typical in biological and agglutination reactions. Agglutination tests were carried out with *Proteus* OXA A2 OX19 and A19 on 1 000 persons the results showed that *Proteus* A19 is not suitable in testing for typhus but that with *Proteus* OX19 from the National Institute of Health a positive Weil Felix reaction at 1 in 400 is significant. A considerable number of normal people agglutinated OXA in low dilution and OX2 even at 1 in 100.

STUER (p 898) describes methods of drying *Proteus* and other organisms for use in agglutination tests. The dried organisms may be kept as powders or impregnated into filter paper and are satisfactory for the tests. Details are given.

SONNENSCHN (p 529) has found strains of *Proteus* in a large number of wound secretions these were largely H strains. The sera from some of the patients gave positive reactions with *Proteus* A19.

and in three cases tested rickettsial agglutination was positive. In specific infection therefore the Weil-Felix is considered unreliable as an indication of typhus unless positive at a dilution of 1 in 2000. Rickettsial agglutination does not help as it is positive in *Proteus* infection as well as in typhus.

Proteus O19 type Vectors louse and flea

Epidemiology

Louse borne—MEGAW (p. 27) has written an account of louse borne typhus with special emphasis on the clinical features and method of diagnosis. The original paper includes a short note on the other rickettsial diseases.

In a comprehensive account of typhus BIRAUD (p. 378) indicates the geographical distribution in Europe and the Mediterranean countries and refers to the possibility of epidemic spread during and after the war. He discusses the various vaccines which have been prepared and emphasizes the fact that killed vaccines are safe and do not provoke the incidents which are encountered when the live vaccine of BLANC and LAIGRET is used in North Africa. But although CILCA has given good reports of the oedematous conjunctivae conclusive evidence of the value of these and of the Cox vaccine in the field are not yet available. In comment MEGAW remarks that vaccination should be regarded as a subsidiary method of control.

ZIMMERMAN (p. 27) gives an account of typhus in Poland in 1940. The epidemic which was especially intense among Jews began in many widely separated places early in 1940 and it is suggested that the probable reservoir of infection was clothing infected with dried louse faeces in which it is known that the organism can survive for many months. Spread probably took place by the Jews who were driven from place to place and was facilitated by the overcrowding to which these unfortunate people were subjected. In 1940 about 7000 cases were recorded but there must have been many more as usual case mortality varied with age reaching 30 per cent or more in persons over 35. PRIMITIVO DE LA QUINTANA (p. 176) gives an account of typhus in Spain including the epidemic of 1939-41. Control was hampered by the prevailing state of malnutrition, movement of the people and depletion of medical facilities. Various vaccines were used but true evaluation was not possible.

REMOND (p. 443) gives his opinion that in Algeria where the distribution of typhus is not even the areas of endemicity are those in which crops are liable to fail in seasons of drought and where the diet is generally deficient in proteins, fats and vitamins whereas in areas in which outbreaks are only occasional and are due to imported cases the nutritional status of the people is good.

Louse borne typhus is endemic in Asmara (Eritrea) and CROBINO (p. 89) gives an account of its epidemiology there.

MACCHIAVELLO and CIFLENTES (p. 593) note that louse-borne typhus is common in Chile and that flea-borne typhus occurs; they do not believe that the latter constitute a reservoir of infection of the louse-borne disease.

Flea borne—ESKEY (p. 834) shows that in 10 years about 20000 cases of murine typhus have been reported in the United States and that many more have probably not been recognized. Most cases can

be traced to domestic rats and he discusses the various measures of rat control TOPPING and DYER (p 690) note that although endemic typhus [of murine origin] is still in the main confined to the south and south eastern States of the United States it appears to be spreading and increasing numbers of cases are being reported from rural areas *Xenopsylla cheopis* has been found in Iowa and other mid western States

ALICATA and BREAR (p 767) report on typhus (of murine origin) in Honolulu where 202 cases were found in 5 years in one district alone One strain of rickettsia from man was immunologically identical with strains from local rats and with the Wilmington strain Strains were isolated from the brains of local rats

MENDOZA (p 767) reports flea borne typhus from San Salvador but states that head lice from one patient contained rickettsiae and caused death (in one case with scrotal reaction) in three rats after being ground up and injected EDMUNDO VÁSQUEZ (p 767) refers to similar cases from this area in some the Weil Fern reaction was negative but in his opinion the disease is murine typhus though more laboratory investigation is necessary before a true assessment is possible

FLOCH (p 768) reports a case of flea borne or possibly tick borne typhus in Cayenne

SORDELLI *et al* (p 385) have inoculated guineapigs and rats with blood from a series of typhus patients in Argentina The results did not give a picture characteristic of that given by murine strains although the authors do not deny a murine origin In comment MEGAW suggests that an epidemiological investigation might yield interesting results CARRETERO (p 36) describes a mild outbreak of typhus apparently of murine type in Valparaiso

From the Gold Coast FINDLAY *et al* (p 593) describe a case of typhus from which rickettsiae were passaged in guineapigs a scrotal reaction was given only at the third passage Similar rickettsiae were isolated from local *Rattus rattus* and *Cricetomys gambianus* and specimens of *Xenopsylla cheopis* from giant rats gave febrile reactions after being triturated and injected into guineapigs The black rat strain gave cross immunity with both the human and giant rat strains The source of infection was probably the black rat and the vector probably *X. cheopis* SMITH and EVANS (p 384) describe four cases of typhus in British soldiers in a West African colony in which the disease has not hitherto been found they name it murine typhus but do not indicate any epidemiological or laboratory investigations to support their contention that it was of murine origin *Proteus* OX19 was agglutinated in higher titre than OX2 or OXA

ECCALDI (p 833) discusses fevers of the typhus group in Brazzaville concluding that murine typhus is endemic and that inapparent attacks may occur In comment MEGAW states that the fevers of this group in West Africa are still something of an enigma MOUSTARDIER (p 594) describes a probable case of murine typhus in Brazzaville

Actiology

FELIX (p 230) explains that *R. prowazekii* has a heat stable antigen which corresponds to the O antigen of *Proteus* X19 it has also a heat labile antigen which gives rise to protective opsonins The latter is probably similar to the Vi antigen of *Bact. typhosum* which alone effectively immunizes animals against the virulent 1:4:0 bacilli

The heat labile antigen is not merely toxic but also has the property of inhibiting the interaction between the *O* antigen and the *O* antibodies thus protecting *R. prowazekii* against the opsonizing and bactericidal action of the natural and immune *O* antibody. The author goes on to say that there is no convincing evidence that convalescent human sera or animal sera have curative value probably because antibodies to both the heat labile and heat stable antigen are not present. He suggests that the difficulty may be overcome by immunizing animals with the heat stable *O* antigen of *Proteus O119* which is believed to be common to that organism and *R. prowazekii*. This is now being attempted in horses and in some animals very high titres to the Weil-Felix reaction have been attained. We do not yet know the best means of maintaining the labile antigen in vaccines and it is possible that phenol and formalin may damage this as they damage the *I* antigen of *B. typhimurium*. The Weil-Felix responses of volunteers vaccinated with various vaccines have been investigated and have shown wide differences. Serum neutralization tests are contemplated and it is possible that opsonization tests will be used to measure the response to the labile rickettsial antigen. Since Castaneda thinks that the *O* antibody plays no part in the opsonization of *R. prowazekii*.

In a series of cases of epidemic and murine typhus VAN ROOYEN and BEAR-SOFT (p. 805) found that both responded to *Proteus O119* at much higher titre than to *O1* or *O1K* and that with the rickettsial agglutination test the epidemic case agglutinated the epidemic rickettsial antigen far better than the murine and vice versa. It appears that the rickettsial agglutination test will differentiate the two diseases in a fairly clear-cut manner.

By the use of a new complement fixation technique details of which will be published later PLÖTZ (p. 443) has been able to differentiate epidemic from endemic (murine) typhus. Cross fixation occurred in a minority of cases but only at much lower titres than with the homologous serum. Investigation in Brill's disease support the view of ZIEHL that this is a form of epidemic typhus and not of murine origin. The observation indicates that man serves as a reservoir of epidemic typhus between outbreaks as does the rat in endemic typhus and that Brill's disease is not spread by lice simply because lice are not present. By applying the new test endemic typhus has been discovered in Jamaica and endemic typhus in a South American country.

RYNOLD and POLLARD (p. 897) state that an epidemic typhus vaccine of the Cox type is ineffective antigen for use in the complement fixation reaction which differentiates well the various rickettsial diseases. Positive results were given with a known specific typhus serum and with the serum from one of two typhus patients (the repeat result was with a serum taken as early as the 5th day) but not with antisera from Rocky Mountain fever and other diseases. Negative reactions were given by sera from persons who had been vaccinated against typhus and false positives therefore do not occur in this type of test. A larger series of sera from typhus patients has been investigated.

Transmission

LÖFFLER and VOOER (p. 28) in a paper on the transmission of typhus make several important points. Rickettsiae are present in the faeces of infected lice but not in their salivary gland; they may

enter the body through scratches on the skin by means of contamination of the biting apparatus of the louse through the conjunctiva or by inhalation. Lice do not become infected by biting persons with in apparent attacks. Infected louse faeces constitute the reservoir in inter epidemic periods. Infected head lice have frequently been found thus disposing of the view that they play no part in transmission when the head of a louse infested convalescent is shaken there must be great opportunity for scattering infected dust. Cases are quoted in which infection by the inhalation of infected particles by laboratory workers engaged on the intranasal inoculation of mice could be the only explanation of illness. Such workers and others engaged in typhus research are particularly liable to infection. Vaccination is at least useful in modifying the severity of the disease but other forms of protection such as louse-proof clothing and gas masks are essential.

Loos (p 532) notes that typhus rickettsiae may be maintained alive in animal tissues for 6 months or more if kept sterile at 18 C.

In the *Army Medical Department Bulletin* (p 900) it is shown that even 48 hours intimate contact of infective lice with Lethane 384 special failed to kill the rickettsiae. Reference is also made to the great infectivity of dried infected louse faeces and the danger to man of inhalation of such material. DONALD and BARKER (p 30) give an account of the clinical features of typhus in a prison camp in Germany. It is noted that 16 of the 21 patients were employed in handling clothing at the camp disinfectory.

As a result of attempts to infect guineapigs with the blood of convalescents from typhus POTARCHICK (p 893) concludes that such convalescents do not play an important rôle in the epidemiology of the disease.

ROSE (p 832) discusses the methods of louse control in use in Germany. Heat fumigation with HCN and other gases applications for the body and anti louse powders are mentioned. Details should be sought in the original abstract. The dry cleaning of clothing with fat solvents is effective against lice and the author states that there may sometimes be good reasons for disinfecting barracks railway coaches etc.

In the American periodical *Soap* (p 899) is an account of DDT (dichlor diphenyl trichlorethane) the highly efficient insecticide now so largely used. It is a stomach and a contact insecticide but in this paper only brief reference is made to its use.

BUSVINE (p 601) has found that lice have about the same resistance as bedbugs to HCN and SO₂. These fumigants are not considered suitable for clothing. For the destruction (in bins) of lice and their eggs on garments liquids such as heavy naphtha or trichlorethylene equivalent to two gallons per 1 000 cubic feet are effective within 54 hours.

Pathology Clinical features Tests

CHIARI (p 444) describes the pathology of typhus in patients who had died between the 8th and 15th days of the disease. The essential lesion is a band like infiltration of lymphocytes (with a few polymorphonuclear cells) surrounding the smaller arteries like a sheath with swelling (and sometimes necrosis) of the intima and thrombus formation. These vascular changes are common in the brain heart testes stomach and intestines. Macroscopically there is congestion

of the brain and lungs and the spleen is enlarged soft and congested.

ABRIKO OV (p. 764) states that the essential pathological lesion in typhus is a generalized acute arteritis especially of arterioles and capillaries the lesion of which are necrosis of the wall, thrombosis, cellula proliferation. These changes are found in all organs especially the brain where they give rise to a specific form of encephalitis.

SYLLA (p. 445) refers to gangrene in typhus. This is usually restricted to small areas but may be extensive. Thrombosis is usually confined to small vessels but in rare cases large arteries may be involved. Spasm of the vessels is believed to play the chief part in gangrene and this has been thought to be caused by the formation of nodules in the vessel of the vasomotor centres of the brain though it often follows exposure to cold and is rare in warm weather. Warmth and various drugs are used to combat spasm and gangrene is treated on the generally accepted lines.

LEVENTUL (p. 445) remarks that disturbances of the peripheral circulation occur early in typhus and that the pallor, slight cyanosis and low blood pressure are to be explained by damage to the vasomotor centre caused by formation of nodules in the small blood vessels [see CRIARI above]. Electrocardiographic changes may show myocardial damage from the third day—they are of the same type as those seen in diphtheria. In treatment the author deprecates the use of hot baths if the circulation is failing—caffeine is useful and saline infusions may be valuable. Strophanthin in small doses cannot yet be dispensed with and the use of sympatol and cardiazol is referred to.

FANTA and SIEDEK (p. 234) show that in stuporose patients suffering from typhus the blood pressure in the cerebral arteries is low though in the brachial arteries the pressure are reasonably high. In mentally clear patients the cerebral pressures are not so low though still somewhat below normal. The cerebral pressure is the same as that in the renal artery and the latter was estimated by the method of Muller.

STURI (p. 381) relates many of the manifestations of typhus to destructive proliferative thrombo-arteritis which interferes with the blood supply of the various centres of the brain stem especially those of the hypothalamus. He discusses differential diagnosis emphasizing certain features—rapid onset, simulating influenza, insomnia, dry, leathery tongue, marked shift to the left in the polymorphonuclear index, moderate acceleration of the sedimentation rate, an early positive diazo reaction. The rash is not a reliable guide and the Weil-Felix test may give equivocal results though its great value is recognized.

WENSCH (p. 387) states that in the early stages of typhus there occur neurological symptoms such as intractable headache, deafness and sometimes disorders of speech and twitching of the perioral muscles which may help to establish diagnosis even in the absence of the distinct exanthem. Therapy consists in relieving the pressure of the cerebrospinal fluid by lumbar puncture and the administration of strophanthin (to support the cardiovascular system) in strong solution of glucose which exerts a dehydrating action.

BAEYER (p. 831) discusses the mental disturbances in typhus and describes patients with a syndrome resembling that of Korsakoff many other types of disturbance are mentioned.

GRUBILLER (p. 809) records six cases of localized neuritis in typhus.

McARTHY (p. 767) gives an account of a small outbreak of louse typhus in Ireland—the disease had not been reported there during the

previous 9 years but the author surmises that it may have persisted during that time in the form of mild attacks resembling influenza. In a description of the symptoms of typhus HOFF and VON BRUNN (p 299) note that ambulatory and mild attacks were seen in Russians from endemic areas and in immunized persons. In these cases which simulated influenza the rash sometimes was absent or fleeting.

DEANIG (p 30) writing from experience in Germany goes into detail on the differential diagnosis of typhus which he makes largely by close observation of the clinical signs. He notes that the Weil Felix reaction though usually positive on the 5th day may not be so until the 15th-20th day (in 20 per cent of cases) or may remain negative. A titre of 1 in 100 is very significant. He states that inexplicably high fever in wounded and frostbitten patients should indicate the possibility of typhus.

MIHALJEVIČ and RADIČEV (p 446) trace the changes in the blood picture in typhus. At first leucocytosis is common with neutrophilia and a shift to the left but this is often followed by leucopenia. Similarly a lymphocytosis may be succeeded by lymphopenia in turn followed by convalescent lymphocytosis. White cell counts above 20 000 indicate a bad prognosis as do progressively increasing counts and marked qualitative changes in the blood picture. LAMPERT (p 595) also discusses the polymorphonuclear leucocytosis in typhus which falls to normal during convalescence the lymphocyte count is low at first but rises temporarily towards the end of the fever. There is a shift to the left in the Arneth index.

BENHAMOU (p 893) has found rickettsiae in the sternal marrow of typhus patients and describes the various forms seen. In boutonneuse fever the findings are of the same general type and the author claims that by sternal puncture early diagnosis may be made in the e and possibly other rickettsial diseases.

ALWENS (p 687) describes the clinical features of typhus. He remarks that apart from the effects due to formation of nodules in the blood vessels toxins play an important part in causing early disturbances of the nervous system and that convalescent serum is often helpful in combating these. He describes the treatment of typhus in some detail laying stress on the value of cardiac tonics.

LEWICKI (p 531) gives an account of the clinical features and treatment of typhus for details the original abstract should be consulted. He has found convalescent serum and transfusion of blood of vaccinated persons useless.

BURY (p 31) writing in a German journal of his experience in Poland has little good to say of the effect of sulphonamides in treatment except in relation to secondary infections. SCHELLER (p 299) claims that treatment with chinifortan a combination of quinine and sulphanilamide is successful in reducing the febrile period in typhus. Twenty three cases were treated with good results the total daily dose was 1.05 gm quinine and 2.1 gm sulphanilamide.

VAN MEERENDONK (p 237) states that mepacrine (atebrin) has a therapeutic action in typhus and that it acts on the causal organism [but produces no proof of the latter statement]. He has found a low blood calcium content in typhus and therefore gives calcium in a combined treatment which consists of 0.1 gm mepacrine three times daily and injections of calcium gluconate or calcium chloride. He claims good results.

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ALBERT and BUCH (p. 130) have tested the sera of people from a rural and an urban endemic area of typhus. Many gave positive Weil Felix reactions at low titre and some at 1 in 100 or more; many gave positive results with the Widal test or tests against dysentery bacilli. It is known that the Weil Felix test may show a rising titre during the first week of an attack of typhoid, but the titre does not continue to rise after one week; whereas the Widal shows a continued rise beyond that time. The authors claim that when an anamnestic reaction can be excluded a Weil Felix titre of 1 in 200 is diagnostic of typhus and 1 in 100 suggests it. Repeated tests are the best means of excluding the fallacies due to anamnestic reactions.

SUPPLE and FISCHER (p. 688) in a discussion of the Weil Felix reaction state that positive results at 1 in 100 are suggestive but that those at 1 in 200 are not absolutely diagnostic. On the other hand titres of 1 in 100 are never seen in diseases other than typhus. Weak positive reactions which soon became negative were found in persons who had been vaccinated with an unspecified vaccine. The Weil Felix test may be weakly or moderately positive in trench fever. The Widal reaction may be strongly positive in persons suffering from typhus who have previously been inoculated against typhoid; this may lead to a wrong diagnosis.

MALY (p. 236) regards a Weil Felix reaction at titre 1 in 100 as suggestive of typhus, one of 1 in 200 as diagnostic. The titre is related to the intensity of the reaction of the body rather than to the severity of the infection. In cases with serious symptoms a low titre reaction indicates bad prognosis. Relatively high titres were seen in patients treated with convalescent serum; this is probably the result of stimulation of antibody formation. The author notes that in doubtful cases the rickettsia agglutination test is useful and that diagnosis may be made by histological examination of an excised roseola of the skin.

SCHULTZ and MEYER-SCHMIDT (p. 137) have shown that the Weil Felix reaction (titres of 1 in 200 or more) becomes positive in typhus in the following percent ages —

Day	3	4	5	6	7	2nd week	3rd week
Percent	30	43	59	60	65	91	99

The average titre is 1 in 100 on the 3rd–4th day, rising to 1 in 1,600 on the 11th day. At a later stage there are wide variations and indeed in individual cases there are unexplained irregularities. GOTTES (p. 596) also gives figures of the intervals between onset of the disease and the appearance of a positive Weil Felix reaction. 85 per cent are positive by the 4th day. Patients suffering from other diseases may give low titre positive results. He draws attention to the great frequency of mild attacks of typhus in communities in which the disease is endemic. In such communities the fever is said to be a common disease of childhood and many of the adults therefore have some degree of immunity against it.

CAUD (p. 599) shows in a large series of tests that there is almost complete agreement between the micro-reaction of Castaneda and Silva and the Weil Felix reaction provided that the results of the former are read within 60 seconds and that the titre of the Weil Felix is 1 in 200 or more. The Castaneda test is performed on a slide with fresh

blood and a formal killed suspension of *Proteus OX19* coloured with methylene blue. Its advantages are simplicity, rapidity and freedom from risk to unskilled persons.

DING (p. 597) states that among 53 undoubted cases of typhus the Weil-Felix reaction was negative or positive only at 1 in 100 in 17. In comment MEGAW suggests that a strain of *Proteus* of low agglutinating power may have been used in the tests. The results of other serological tests are recorded in this series.

Writing of the dry blood agglutination test for typhus and other fevers AHRENS (pp. 529-600) notes that there were significant differences between the results given with the Berlin and the Leipzig strains of *Proteus OX19*. With the Berlin strain 179 sera, all positive to the Weil-Felix test at 1 in 200, were all positive to the dry blood test, with sera positive only at lower dilutions the results were not so concordant. Heterologous agglutinins (for example to the Flexner group and to *Bact. typhosum*) were present in low titre in some sera positive to *Proteus OX19* and in a significantly higher proportion than in sera negative to *Proteus*. In comment MEGAW points out that this dry blood test is likely to be very useful in making rapid surveys and in bedside diagnosis.

SCHAFER (p. 600) has used a suspension of *Proteus OX19* dried on a glass slide; to this is added the serum to be tested and in positive cases clumping is seen within 10 minutes. This test is purely qualitative and may be used as a preliminary to the standard Weil-Felix reaction. TIETZ and CARLÉ (p. 133) describe a rapid diagnostic test with a dry reagent apparently connected with *Proteus OX19*, the details of which are not given.

RENOUX (p. 894) describes an intradermal allergic reaction in typhus. Injection into the skin of a formalized rabbit lung vaccine leads to a reaction like the positive tuberculin reaction in 48 hours in patients recovered from typhus. The intensity of the response appears to vary with the severity of the attack. The test was positive in persons who had received protective vaccine; it was also positive in a few men who had been in North Africa for 7 to 10 years and who were shown by Giroud's serum protection test [see below] to be immune.

ROBINSON (p. 686) reports on typhus in Addis Ababa where diagnosis is not easy because the rash could be detected in only 6 per cent. of cases. Albuminuria was almost constant. The Weil-Felix reaction was reliable but did not become positive until the fifteenth day or later in about half the cases. The author has used the Weigl vaccine for diagnosis; he states that in healthy persons injection (presumably intradermal but this is not made clear) of 1 to 10 million rickettsiae caused a violent local reaction but that in 54 cases of typhus there was no reaction even in the early stages when the Weil-Felix was negative nor was there a reaction in 70 with positive Weil-Felix. This vaccine was successful in protecting the medical staff. In some children the disease was very mild; in certain cases there was reason to believe that the patients had suffered previous attacks.

CLAVERO and PÉREZ GALLARDO (p. 530) have used the Giroud intradermal test in rabbits (in which suspensions of *Rickettsia prowazekii* from fowl embryos are mixed with the serum to be tested for 20 to 90 minutes before injection into the animals) and have found that sera from patients convalescent from typhus gave protection which was not produced by sera from patients with other diseases. The

reaction may be useful in disclosing inapparent infections and in estimating the protective value of vaccines and sera.

TRAUTMANN (p. 386) claims that the Weltmann coagulation test gives a clear indication of prognosis even in the early stages and that it is helpful in diagnosis. Detail are given in the abstract. WARNECKE (p. 689) has found that serological reactions for syphilis become positive in a small proportion of patients with typhus, but the results with the several tests are not consistent. MEYER (p. 689) remarks that his earlier results with the Catochol and the Meinicke tests.

LEWIS (p. 382) describes a test of urine to which is added anti-typhus serum and in which a disk of precipitate forms at the junction of the fluid and an agglutination test in which to the urine and serum is added a solution of granular magnesia. These are said to be useful in typhus.

Immunization

CATAPANA (p. 125) has found a Mexican strain of epidemic typhus which is well adapted for mice and which has a high protective value. Vaccines from the mouse-lung, epidemic strain and the rat lung mixture can when mixed form a bivalent vaccine whose constitution can be varied at will. A preliminary trial in Mexico of immunization with a rat lung strain only was not satisfactory and on the assumption that cross protection against the epidemic form of the disease was poor the authors used the epidemic antigen as indicated above. In the field three doses could be given but for laboratory work five are advised.

OTTO and B. KHELDT (p. 129) have tested in guinea pigs the protective properties of a number of vaccines of *R. prowazekii*. Mouse-lung, rabbit lung and Cox's vaccines all gave good protection and the authors have recommended mouse-lung and yolk sac vaccines for human use.

COUBERTON *et al.* (p. 34) have found that vaccines of *R. prowazekii* prepared from the lungs of mice and given intranasally or intratracheally in a few cases gave moderate but variable degrees of immunity. In general, better results were obtained when the total dose was given in three doses at intervals of five days than when only one or two doses. The mouse-lung vaccine was rather better than that from the lungs of dogs. In each case the rickettsiae were killed with formalin. After infection the dogs were kept at 0 C. and usually died in 72 hours.

GIFORD and PANTHIER (p. 35) have shown that guinea pigs and rabbits infected with *R. prowazekii* and subjected to the daily injection of bacterial toxins react more feverishly than normal animals to the infection. The same authors (p. 36) have shown that large quantities of vaccine can be prepared from the lungs of rabbits infected by the intratracheal route. For this purpose it was originally necessary to make from a mouse-lung strain of rickettsiae in order to infect the rabbits but this was inconvenient and the difficulty was overcome by keeping the rabbits in a cold environment and injecting them with suspensions of dead bacteria. The immunizing power of the vaccine is apparently high. GIFORD (p. 36) has shown that a formal saline extract of rabbit lungs infected with *R. prowazekii* has considerable power in producing protective substances in the serum of animals injected with it.

VARELA and PARADA GAY (p 532) have demonstrated in a large series of experiments that the growth of orchitic strains of typhus rickettsiae [murine] in the peritoneum of the rat can be enriched by injection of fresh heart blood of guinea-pigs intraperitoneally into the rats one three and four days after infection

GOLD and FITZPATRICK (p 32) record two cases of mild laboratory infection with *R. prowazekii* in laboratory workers who had previously been vaccinated with the Cox vaccine In one case infection probably took place by inhalation in the other infective material was splashed over the face and eye The authors point out that if vaccination is adopted on a large scale for the troops a watch should be kept for mild cases which may be indistinguishable from influenza and similar fevers LOFFLER and MOOSLER (p 28) note that a feature of attacks contracted by inhalation is an influenza like catarrh of the lower air passages possibly due to local reaction at the point of entry

VAN DEN ENDE *et al* (p 449) report on two outbreaks of typhus in laboratory workers engaged in experiments during which intranasal inoculation of mice was performed Experiments with *Citr. prodigiosum* showed that large numbers of organisms are scattered into the air during this operation in spite of the precautions taken All the subjects had been vaccinated with killed vaccine either of the rat lung (murine) or of the yolk sac (epidemic) type and many had received several injections of vaccine The attacks were moderately severe or mild the rash was not present in all cases and in its absence diagnosis was difficult The Weil Felix reaction was not helpful in the first week Rickettsiae could not be recovered by inoculation of blood into guinea-pigs and lice fed on one patient did not become infected

CIUCA *et al* (p 381) point out the necessity for vaccination of all workers in laboratories who handle typhus material

BARTH (p 134) has cultivated a strain of *Proteus* X19 in a medium to which the blood of a typhus patient was added Guinea-pigs inoculated with a vaccine from a culture passed 50 times in this medium developed considerable resistance to typhus and the author suggests that such a vaccine may afford some protection to man This would not entail the risk of introducing the rickettsiae of typhus into an uninfected community

Indeterminate type Vector tick

PATINO CAMARGO (p 533) has found orchitic strains of rickettsiae in the blood of patients and in rat fleas in Bogota where isolated cases of typical typhus had occurred It thus appears that in Colombia there are three rickettsial diseases—louse borne typhus tick borne spotted fever and typhus of murine origin The rats were *Rattus rattus* and *R. norvegicus* the fleas *Ceratophyllus fasciatus* and *Leptopsylla segnis* The same author (p 900) refers again to the three forms of typhus found in Colombia He cites three occasions on which murine rickettsiae were isolated in Bogota twice from the blood of patients and once from fleas collected from *Rattus norvegicus* He (p 298) reports an outbreak of typhus in Colombia the type and vector were not determined but in several cases the Weil Felix reaction to *Proteus* OX19 was positive at titres of 1 in 160 or more

JIMÉNEZ MARTÍNEZ (p 447) describes two forms of typhus which exist in Colombia the louse-borne and tick borne types The tick borne form is a non epidemic disease of rural distribution is especially frequent in the hot season is transmitted by *Amblyomma cajennense*

and gives cross immunity with Rocky Mountain fever and the petechial fever of Tobia. Small rodents probably form the reservoir of this disease.

PARKER (p. 148) states that two strains of rickettsiae of Colombian spotted fever showed complete cross immunity with Rocky Mountain fever. He shows that the rickettsiae of this fever and of the tick bite fever of South Africa can persist in the tissues of *Ornithodoros* ticks for very long periods although these ticks are not known to be spontaneous transmitters. Infected ticks have been used to convey the rickettsiae from one part of the world to another for experimental purposes.

The dog has been shown to be the reservoir of infection with Brazilian typhus. DE MAGALHAES and ROCHA (p. 300) have tested the blood of 135 naturally infected dogs from declared foci in Minas Geraes. In most of the dogs with positive Weil Felix reactions all four strains of *Proteus* (OXY9 OX² OXL and OXK) were agglutinated.

In rural areas of Sao Paulo where tick borne typhus is common TRAVASSOS and VALLEJO (p. 386) have found the preta (*Cavia aperea*) and the capybara (*Hydrochoerus capybara*) susceptible to the disease though some captured wild were immune presumably as a result of previous infection. None of the animal was harbouring rickettsiae. Ticks which transmit the infection to their offspring are regarded as lasting reservoirs but the authors think that rodents act as temporary reservoirs probably causing periodical increase in virulence. The severity of the human disease is greatest in places where the rodents are most numerous. The same authors (p. 387) have transmitted the infection from a capybara to a guinea pig by the bites of laboratory bred *Amphispiza cajennense*.

ANGSTEIN and BADER (p. 386) have discovered in Texas a fever which produces immunity to a Montana strain of Rocky Mountain fever. The only tick found was *Amblyomma americanum* which has never been shown to be a vector in nature although other members of the genus *Amblyomma* are proved vectors of Brazilian tick typhus. [See TRAVASSOS and VALLEJO above.] PARKER *et al.* (p. 835) have recovered the rickettsia of Rocky Mountain fever from a batch of *Amblyomma americanum* from Oklahoma. Animal infected with this or any showed complete reciprocal cross immunity with others infected with Rocky Mountain fever or boutonneuse fever. South African tick bite fever and the maculatum infection [see this Bulletin 1940 v. 37 254]. Rocky Mountain fever vaccine protected against this rickettsia. There was no cross immunity with Q fever but there was some evidence of partial cross immunity with epidemic typhus. Two outbreaks of Rocky Mountain fever closely associated with *A. aperea* are described.

PHILIP (p. 533) gives a list of the known and potential vectors of Rocky Mountain fever in the United States. DAVIS (p. 533) has shown that *Ornithodoros parkeri* is capable of transmitting Rocky Mountain fever to guinea pigs and suggests that it may help to maintain the disease in animal in nature.

BRIGHTON and WATT (p. 238) have found three highly virulent strains of the rickettsia of Rocky Mountain fever in Georgia where the strain usually recovered are generally mild.

In a histological examination of the brain of a patient who had died from Rocky Mountain fever SCHEINKER (p. 690) found military granulomata associated with changes in the capillary vessel. The cells

of the granulomata appeared to have been derived from the adventitial cells of the capillaries they had proliferated and the final stage of the process was necrosis of the cells and disorganization of the capillaries

An account of the clinical features and treatment of Rocky Mountain fever is given by BAKER (p 902) who refers to the probable value of hyperimmune rabbit serum He notes that the incidence and severity of the disease vary greatly from year to year

TOPPING (p 837) has extended his work on the therapeutic and protective value of concentrated hyperimmune serum of rabbits in experimental Rocky Mountain fever In treatment it is effective in guineapigs 120 hours after infection (i.e. on the second day of fever) but in large doses only Results in man indicate a definite value in a dose of 10 cc per kgm of body weight even when given (intramuscularly) on the third day of fever or later The death rate in a considerable series of patients was reduced more than would have been likely by chance TRAVASSOS and VALLEJO GFFIRE (p 768) have confirmed the work of TOPPING by demonstrating that serum from rabbits hyperimmunized with rickettsiae of the tick borne group (Sao Paulo) has a pronounced curative effect in the first days of fever in experimental animals It also neutralizes the rickettsiae *in vitro* and *in vivo* confers passive immunity and prevents infection when injected during the incubation period

STEINHAUS and PARKER (p 691) failed to find evidence of any therapeutic value in certain sulphonamides mepacrine and tyrothricin in experimental Rocky Mountain fever

PARRER and STEINHAUS (p 691) have found that samples of tick tissue vaccine against Rocky Mountain fever had maintained full protective power after having been kept for 12 to 14 years at 34-40° C

In discussing South African tick borne typhus GFAR (p 591) states that although the animal reservoir hosts have not been determined the striped mouse and the gerbil are suspected the dog is believed to be a conveyor of infected ticks rather than a reservoir of infection In most cases the disease is transmitted by larval ticks which are so small as to escape notice Agglutinin titre. to *Proteus* OX19 and OX2 are low but a patient agglutinating only OX2 is almost certainly suffering from this fever OXA may also be agglutinated but as a rule in very low titre

MOUSTARDIER (p 594) reports several cases of eruptive fever in Brazzaville which were probably tick borne typhus BARLOVATZ and JOUF OVSKY (p 37) describe from the Belgian Congo a sporadic disease which clinically closely resembled boutonneuse fever but in which there was no evidence that ticks were implicated in transmission The Weil Felix reaction was strongly against transmission by fleas or mites

CAYAZZI (p 901) from the Ethiopian highlands records five cases of boutonneuse fever The attacks were severe the tache noire was present and the reactions to *Proteus* OX19 were negative or positive only in moderate titre except in one case positive at 1 in 640

SINGH (p 901) reports a case probably of tick typhus from Meerut India the Weil Felix reaction was negative

From the far eastern U.S.S.R. ROTENBURG (p 300) describes tick fever which conforms to the picture of tick borne typhus The vectors and reservoir hosts are as yet unknown

Q fever

DERRICK *et al* (p 304) state that human infection with Q fever may result from —(1) Direct attacks from native ticks (*Ixodes holocyclus*) in the absence of cattle (2) Direct infection from the body tissues and fluid of infected cattle (3) Indirect infection from infected cattle by the tissues or excreta of ticks (especially *Boophilus australis microplus* but perhaps also *Haemaphysalis bancrofti*). The third is probably the most important. Inhalation of dried faecal dust of the ticks is a possibility. The cow probably plays an important part in the transmission of Q fever to man.

Ixodes holocyclus is the tick which most commonly attacks man in Australia. It is a potential vector of Q fever as has been proved experimentally by SMITH (p 388). Infection is not apparently passed from adult ticks to their progeny. Infection was not found in a considerable number of ticks and larvae collected in nature from bandicoot and the author suggests as a result of experiment that bandicoots soon cease to be infective. Tick may cause infection in man either by infecting domestic animal from which man may become infected or directly by bite.

SMITH (p 601) shows that *Haemaphysalis bancrofti* a tick which infects cattle in Queensland and New South Wales can transmit Q fever experimentally by bite. It is probably responsible for some transmission in nature. *Ornithodoros gurneyi* can be infected but failed to pass on the infection in the experiments recorded.

DAVIS (p 903) has established that *Ornithodoros moubata* and *O. hermsi* infected with *Rickettsia diploica* as nymphs were able to transmit by bite (after reaching adult stage) for 428 and 772 days respectively and harboured the rickettsiae for 670 and 979 days. Fasten had no effect on virulence. Progeny of *O. moubata* were infective; those of *O. hermsi* not. It is possible that the former tick is a vector in South Africa though Q fever has not been recognized there.

PARKER and STEINHAUS (p 769) have found the rickettsiae of Q fever (both American and Australian forms) in the organs of infected animals for varying period but in the kidneys they were repeatedly found for as long as 170 days. The rickettsiae persisted for 100 days in the seminal vesicles but tests produced no evidence that the disease could be transmitted during the act of copulation. Samples of urine from the animal were sometimes positive.

Trench fever

A comprehensive account of the clinical features and the different clinical types of trench fever is given by MARIE (p 903). The detail should be sought in the original abstract. KERRER (p 136) also gives a clinical description of trench fever in which he stresses the protean nature of the symptoms. These were all described in the British literature of the war of 1914-18. V. BORMANN (p 838) describes the fever with notes on the varied manifestations seen in German troops in Russia.

WINDORFER (p 446) notes the importance of severe pain in the shin bones. These are increased by warmth and may persist without the periods of remission which have been regarded as characteristic of the disease and the pains may shift to the knees and thighs and to joints. Paroxysms of fever at five-day intervals may or may not occur.

For the relief of pain aspirin or pyramidon may suffice but morphine may be needed few of the author's cases were admitted to hospital

SYLLA (p 38) gives a clinical description of trench fever He regards it as a louse borne infection but is not satisfied that it is purely a rickettsial disease

ARNETH (p 301) discusses the leucocyte picture there is leucocytosis with a shift to the left followed by great increase in the number of large mononuclears and large lymphocytes He makes some observations on treatment

WERNER (p 387) discusses the possibilities of laboratory diagnosis of trench fever

WESTPHAL (p 692) records a fever seen in Eastern Ukraine The pyrexia was of short duration the spleen enlarged and there was a macular rash Shin bone pains were absent but the author does not exclude the possibility that this was a form of trench fever

Charles Wilcocks

MALARIA

- 1 SHEINKER K P [Epidemiological Role of Malaria Parasite Carriers in an Endemic Area] *Med Parasit & Parasitic Dis* Moscow 1943 v 12 No 4 24-32 [In Russian]
- 11 SARIKIAN S J [Parasite Carriers in relation to an Epidemic Outbreak of Malaria in Central R S F S R] *Ibid* 32-40 [In Russian]
- 111 REMENNIKOVA V M [The Importance of Carriers of *P. vivax* and *P. falciparum* in the Epidemiology of Malaria] *Ibid* 47-57 [In Russian]
- 1V SHISHLIAEVA MATOVA Z S [Epidemiological Role of Parasite Carriers in Malaria] *Ibid* 57-64 [In Russian]

These four papers are devoted to observations on symptomless carriers of malaria parasites both of the contact and convalescent types The main object of these studies is to establish the incidence of carriers in endemic areas to determine their epidemiological significance and to devise methods for their control

1 Sheinker records observations carried out in the Caucasus in the course of three epidemic seasons (May-October of 1938 1939 and 1940) in a settlement with about 300 inhabitants who were examined once a month

The number of carriers varied as follows in 1938 there were 77 persons in 1939 48 and in 1940 21 During the period covered by these observations symptomless carriers constituted 43.7 per cent of all the cases which showed parasites (total 546) About two-thirds of the cases were benign tertian less than one third subtertian and only a few quartan As regards the age incidence of carriers this was relatively higher in children up to the age of 15 than in adults An analysis of the available material has shown that the majority of carriers had previously manifested clinical symptoms [= convalescent carriers]

The proportion of carriers in the community was considerably reduced by treatment in 1938 they represented 26.3 per cent of the population while in 1940 the percentage was only 6.2

In the majority of carriers (71.6 per cent with *P. vivax* and 73.3 per cent with *P. falciparum*) the spleen remained normal; therefore in mass survey the size of the spleen alone, unaccompanied by blood examination, does not provide a true picture of the local prevalence of malaria.

It has been demonstrated experimentally that in spite of the relatively small number of parasites present in the blood of carriers mosquitoes are readily infected from them. Parasite carriers are thus of considerable epidemiological importance.

It is suggested that in malarious localities the following measures should be taken: (a) the detection of all carriers among those who have suffered from malaria during the preceding and current year; (b) the detection and thorough treatment of clinical cases; and (c) the periodical examination of the blood of patients between the cycles of treatment and the reduction of the intervals between these cycles if parasites are still present.

U. Sankhian's observations were made in two localities of central Russia; the inhabitants of which were examined twice a year in the course of two years (1935-6).

In one settlement with a population of 1859 there were 514 parasite carriers and 560 cases of clinical malaria; the parasites being *P. vivax* and *P. falciparum*. The parasite rate for this settlement was 27.9 per cent; the percentage of carriers being 27.6 in 1935 and 5.2 in 1936. It was found that 35.9 per cent of parasite carriers who belonged to different age groups have never shown any clinical symptoms (= contact carriers). This category of carriers represents the most dangerous element since they usually escape detection.

In the second community a single examination of each inhabitant in 1935 revealed 300 parasite carriers (50.7 per cent) of whom 73 per cent had *P. vivax* and 19.1 per cent *P. falciparum*. In 1936 the percentage of carriers dropped to 21.3 per cent.

In general it was observed that after an epidemic outbreak of malaria a large number of parasite carriers appear among the population in the following spring; the majority without a previous history of malaria.

The author emphasizes the importance of detecting and treating carriers.

U. Remenniko reports work carried out in a rural settlement of Uzbekistan (Central Asia) with a very high incidence of malaria (11.5 per cent of the population in 1938, 11.8 per cent in 1939, 30.5 per cent in 1940 and 42.5 per cent in 1941). In 1942 the parasite rate of the general population was 8, varying in different groups from 28.8 among the hospital staff to 1.5 in a collective farm. The rate was especially high (42.9) in children up to the age of 12.

The comparative epidemiological rôle of parasite carriers, as demonstrated by feeding mosquitoes on carriers and on patients suffering from subtertian and benignant tertian malaria. The percentage of mosquitoes infected from carriers proved to be very high (75 for *P. vivax* and 85.6 for *P. falciparum*) in spite of the extremely scanty number of gametocytes present in their blood, while the percentage infected from clinical cases proved to be about the same for *P. vivax* (85) but much lower for *P. falciparum* (38.2). However this low figure may be due to the fact that the subtertian patients were in the early phase of infection with immature gametocytes. The number of oocysts in mosquitoes infected from carriers reached 250 in the case of the subtertian parasite and only 25 in the case of the benignant tertian

parasite while in those fed on clinical cases of both types of malaria the number of oöcysts exceeded 250

An analysis of the available data revealed that even in the months (August-September) when the incidence of malaria reaches its maximum the number of clinical cases—usually regarded as the most important from the epidemiological point of view—is about the same as that of symptomless carriers

Thus in spite of the low degree of the infection parasite carriers represent an effective source of infection for mosquitoes. They have a considerable influence upon the course of the epidemic curve because of their large numbers and they are all the more dangerous because owing to the cryptic nature of the infection in them they usually escape detection

iv The main object of the observations recorded by Sh. Shibaeva Matova was the determination of the nature and duration of infection with *P. vivax* and *P. falciparum* in carriers. The work was carried out at a collective farm in Central Asia where in 1942 malaria parasites were found in 296 persons out of a total of 769. Of this number 140 were symptomless carriers; in 43 the carrier state was preceded by clinical manifestations; in 10 this sequence was reversed while only in 103 were the parasitological findings associated with symptoms of disease

During the last few years the population of the farm has undergone prophylactic and therapeutic treatment with acrinine [= atabrin] and plasmocide [= Fournieu 710 or rhodoquine this *Bullet*, 1934 v 31 174 and 178]. Parasite carriers were found both among treated and untreated persons

The duration of infection in carriers was studied in 21 subjects whose blood was examined and temperature taken several times a month. The infections with *P. falciparum* lasted up to 138 days; those with *P. vivax* up to 150 days. The parasites are usually very scanty and in many cases they can only be detected after the examination of several thick blood films

The epidemiological importance of carriers was demonstrated by feeding mosquitoes on them. The mosquitoes could be readily infected with malaria parasites even when the gametocytes were so scanty in the blood that they were actually undetectable in the thick film. Moreover the infection rate was comparable to that in mosquitoes fed on cases of clinical malaria. Systematic treatment reduces the number of parasites in the blood considerably and results in the lowering of the infection rate in mosquitoes to one third

C. A. Hoare

SHISHIBAIEVA MATOVA Z. S. [Study of the Reservoir of Malaria Infection in a Focus with Abundant Mosquitoes and the Epidemiological Effectiveness of Chemoprophylaxis with Acrinine and Plasmocide] *Med. Parasit. & Parasitic Dis.* Moscow 1943 v 12 No 4 41-7 [In Russian]

The observations recorded in this paper were carried out at a collective farm of the Samarkand district (Central Asia) inhabited by a non-immune community living near mosquito breeding places and in close proximity to the populations of hyperendemic foci of malaria. In 1940 the parasite rate in this community continued to be high (41.5 in April, 23 in July, 20 in October) in spite of prophylactic and therapeutic treatment

The object of the present investigation was to determine (1) the effect of combined schizontropic [= anti schizont] and gametotropic [= anti gametocyte] treatment in reducing the incidence of malaria both among the population and the mosquitoes and (2) the anti epidemic importance of these measures under local conditions. According in 1941 the following standard scheme was adopted both for patients and carriers (1) anti relapse treatment (daily dose of 0.2 gm acriquine and 0.04 gm plasmocide) (2) Therapeutic treatment (0.3 gm acriquine and 0.06 gm plasmocide daily for three days interval of five days daily treatment for three days interval of 10 days daily treatment for three days) After two cycles of this treatment followed by an interval of five days the patients underwent chemoprophylactic treatment with 0.2 gm acriquine and 0.04 gm plasmocide daily for two days followed by an interval of five days.

The examination of up to 98 per cent of the inhabitants (125-217) in the course of 1941 revealed a parasite rate varying at different periods from 4 to 29.7 while the incidence of malaria was from 8 to 63 most of these (65 to 100 per cent) being symptomless carriers. The infection was due chiefly to *P. falciparum* and *P. vivax* with a small number of *P. malariae* cases.

The infection rate in wild mosquitoes (mainly *A. maculipennis* or *saccharalis*) varied from 1.8 to 50 per cent in 1940 before treatment with plasmocide was introduced while in 1941 after its introduction the percentage of infected mosquitoes was from 2 to 14.6.

In general systematic treatment with acriquine and plasmocide has not succeeded in producing a notable reduction of the parasite rate in the population though the use of plasmocide has reduced the infection rate in mosquitoes. It is concluded that in localities with a high density of vectors drug treatment should be reinforced by larvicidal measures.

C. A. Hoare

PARADE G. W. Einheimische Malaria [Malaria in Austria] *Munch med Hoch* 1944 Jan 28 v. 91 No 3/4 34-6

Two cases of benign tertian malaria occurred in Innsbruck in the summer of 1942. From the histories of the cases and an examination of local conditions it was concluded that their infection was acquired in Innsbruck the patients a woman and her child lived near a large camp of workers who had come from southern Italy and the Balkans and it was believed that these workers infected the local anopheline mosquito (*A. maculipes*) (variety not mentioned) since malaria is not endemic in Innsbruck. This was the only point of special interest in the cases.

J. F. Corson

WILLIAMSON I. B. Investigation of Ferruginous Waters in relation to the Breeding of Malaria Carrying Mosquitoes 15 mimeographed pp

This investigation which is stated to be not yet complete was made in England chiefly in the London area. Samples of water were collected at Kenwood (Hampstead Heath) at Caesar's Camp (on Wimbledon Common) and at Arbrook Common (near Claygate) water sources around Malvern Worcestershire were also examined. The chemical and physical examinations included the estimation of iron ammonia phosphates and other constituents the pH electrical potential and

relative colour intensity In the biological examination the presence or absence of vegetation peaty organic matter algae and bacteria was noted and controlled experiments with bred out larvae of *Anopheles maculipennis* var *atroparvus* were made The author emphasizes the need for taking several samples at the same time from different parts of the same stream or pond from surface and deep levels of the water and from different waters even when they are close together as so much variation occurs For similar reasons it is necessary to take samples frequently and to make examinations on the spot as well as in the laboratory

In the experiments with anopheline larvae it was found (1) that all larvae died in all the waters tested when no food was added (2) the larvae grew well in all the samples and controls (rain and distilled water) when food was added The author concluded that the waters were not harmful to the larvae except that they were deficient in larval food this being primarily attributable to lack of algae whose growth is probably inhibited by the presence of colloidal iron and associated peaty substances in the water

The author lays emphasis on the need for the presence of excess of rotting vegetation to provide buffer substances for maintaining the stability of the colloidal state of the iron present

Ferruginous waters may be classified provisionally as follows — (1) Water whose iron is derived from underground mineral sources such as pyrites (2) water whose iron is composed partly of organic compounds formed by humus with the iron of the soil in marshy ground and partly of iron contributed directly by the humus (3) water whose iron is derived solely from continued rotting vegetation

Previous investigations by the author [this *Bulletin* 1935 v 32 429 & 731 1937 v 34 367 & 941] which were carried out in Malaya are briefly referred to [For other references to ferruginous water in relation to vegetation and mosquitoes see Senior WHITE this *Bulletin* 1926 v 23 707 BOYD *ibid* 1931 v 28 166 HANCOCK *ibid* 502 FRITSCH *Proc Roy Soc London Ser B* 1907 v 79 197] J F Corson

HAPPER J O Note on the Swarming of Males of *A. funestus* (Giles) in East Africa *East African Med J* 1944 May v 21 No 5 150-51

1 A number of male *A. funestus* were observed assembling inside the threshold of a thatched dwelling in Samia Location Central Kavirondo Kenya Colony some ten miles distant from Lake Victoria Nyanza

2 Between 6.15 p.m. and 6.35 p.m. the swarm increased in numbers from approximately 50-100 to 400-500 and by 6.40 p.m. it had dispersed or disappeared

3 Sixty six mosquitoes captured from the swarm were male *A. funestus*

BAXTER C P & ZETHEK I The *Anopheles* of Panama with special reference to Hand Lens Identification and Notes on Collecting and Care of Specimens *Amer J Trop Med* 1944 Mar v 24 No 2 105-23 2 charts 2 figs & 6 pls [17 refs]

The contents of this paper are somewhat elementary It should however be useful to any entomologist who without previous

experience in work with *Anopheles* mosquitoes finds himself engaged in anti-anopheline work in Panama or adjacent territories. A remarkably compact collecting outfit is described but this appears to be adapted to the authors' personal method of field work.

There are two plates with figures of hind legs of Panama *Anopheles* one of female palps and two of wings—the sixth plate is a mediocre diagram of the adult anopheline. It is intended that specimens should be identified by comparison with these figures and the identification clinched by reference to some very brief notes on the species in the text.

The bibliography attached to the paper omits reference to KOMP 1942 *The Anopheline Mosquitoes of the Caribbean Region* this *Bulletin* 1943: 40: 808. The entomologist might as well commence his work by using Komp's excellent booklet since eventually he will certainly find the paper under discussion insufficient. *John Smart*

LENDRUM A. C. Fixation of Tissues from Cases of Malaria
Memoranda *Brit Med J* 1944 July 8: 44

In tissues fixed in formalin the blood and formalin produce a dark brown deposit which closely resembles malarial pigment. This can be removed from sections by picric alcohol (BARRETT *J Path & Bact* 1944: 46: 135) but Lendrum has found that malarial pigment is also removed by picric alcohol. Although not by itself satisfactory for paraffin sections (MALLORY *Pathological Technique* 1938 p. 39) formalin is less toxic to erythrocytes than other common fixatives. The following procedure overcomes these difficulties.

Fix in 10 per cent formalin for 3 to 6 hours (or in formal sublimate if the tissues are less than 6 hours dead). Transfer to 5 per cent aqueous mercuric chloride and leave for 5 to 20 days.

This is an ideal method for human tissue and is recommended for malarial tissues but as there is still a slight risk of formation of a deposit in malarial tissues should also be fixed in formalin free fluid, the following method being suitable.

Fix in an aqueous solution of 2 per cent potassium dichromate and 5 per cent mercuric chloride for 6 hours. Transfer to 5 per cent mercuric chloride. *J. F. Corson*

SINGH J. & BHATTACHARJI L. M. Rapid Staining of Malarial Parasites by a Water Soluble Stain *Indian Med Gaz.* 1944 Mar: 79 No. 3: 102-4 [14 ref.]

This stain is offered as a substitute for the usual Romanowsky stains the ingredients for which are not costly and difficult to obtain in India. Two staining solutions are prepared as follows.

Solution I. Dissolve 0.1 gm. of medicinal methylene blue in 100 cc. of tap water. Add 0.6 cc. of a 1 per cent solution of H_2SO_4 , then add 0.1 gm. of potassium dichromate. Boil for three hours. Cool. Add 2 cc. of a 1 per cent solution of KOH drop by drop to dissolve the precipitate and filter.

Solution II. Dissolve 1 gm. of water soluble eosin in 500 cc. of tap water.

Method of staining. For thin blood films—fix in methyl alcohol put into solution I for 30 seconds. Wash in tap water of pH 6.2-6.6 put into solution II for one second. Wash and replace in solution I for

30 seconds wash and dry For thick films—put into solution I for 10 seconds wash for two seconds put into solution II for one second wash restrain in solution I for 10 seconds wash and dry

The staining solutions keep well in separate jars and can be used repeatedly Blood films several weeks old can be stained satisfactorily Staining is rapid and the results compare favourably with those obtained with the usual Romanowsky stains The solutions are easily prepared and azur stains alcohol or acetone glycerin and distilled water are not needed

J F Corson

HEIMBERGER Neue Darstellungsweise der Malaria plasmodien [New Method of demonstrating Plasmodia] *Deut med Woch* 1943 Nov 26 v 69 No 47/48 816-17 1 fig

The author advocates a method of blood film making for the diagnosis of malaria which is intermediate in character between the usual thick film and ordinary thin film A drop of blood about half the size of a lentil is spread into a thick film and allowed to dry in the air When quite dry the blood film is cleared by breathing on it This causes the red blood corpuscles to haemolyse and disintegrate so that when the film is again dried and stained a uniform background clearer than that of the usual thick film is obtained In films thus prepared the malaria parasites blood platelets leucocytes and other objects are clearly distinguishable The method is only applicable to freshly prepared films If the films are old some degree of clearing can be obtained by exposure to steam For staining the method recommended is May Grunwald solution followed by Giemsa but presumably any of the methods for fixing and staining blood films may be used

C M Henyon

PACKCHANIAN A A Malaria Thick Films contaminated with Excretions of Flies containing Flagellates (*Herpetomonas*) *Amer J Trop Med* 1944 Mar v 24 No 2 141-3 1 fig

During the course of examination of stained thick blood films for malarial parasites in two films flagellates of the leptomonas type were encountered It was suspected that the flagellates might have been deposited on the films by flies during the process of drying To test this point laboratory bred house flies which were infected with *Herpetomonas muscae domesticae* by feeding them on cultures of the flagellate were allowed to feed on thick blood films in process of drying It was found that flagellates were deposited on the films by the flies [The possibility of house flies contaminating exposed blood films with flagellates has been noted by the reviewer in his *Protozoology* p 1320]

C M Henyon

- 1 POLUMORDVINOV A D [Pernicious Form of Tertian Malaria occurring in Riazan Province] *Med Parazit & Parasitic Dis* Moscow 1943 v 12 No 4 65-71 [In Russian]
- 2 TROITSKY S A [Severe Tertian Malaria in Gorky Province in 1941] *Ibid* 71-5 [In Russian]

Both these papers deal with cases of a pernicious or fulminating form of malaria due to *P. vivax* which has been observed among children in the central areas of Russia [see also this *Bulletin* 1943 v 40 436 668 1944 v 41 257]

1. Polymorphic cases occurred in the Riazan Province where 34 children under the age of 16 died from a fulminating type of malaria due to *P. vivax* in the spring of 1941. The distribution of these cases was not focal and all the evidence suggested that they represented relapse in the spring of incompletely treated recent infections mostly during the second half of the preceding year. As a rule death took place some time after the initial paroxysm. The children who succumbed showed no constitutional anomalies the main subjective symptom being severe headache. The author recommends the following measures against the fulminating type of malaria: (1) registration of all children with a history of malaria during the second half of the year; (2) thorough treatment of such cases; (3) early anti-relapse treatment; (4) immediate treatment of all children manifesting clinical symptoms of malaria during the first half year especially if accompanied by severe headache.

2. Troitska's observations were made in the Gorky Province where 61 fatal cases of benign tertian malaria were recorded in 1941 among children between the ages of 3 and 14. There is evidence that isolated cases of this fulminating form of tertian malaria occurred in the past but in the present instance there was an epidemic outbreak. The acute course of malaria in children is attributed to a change in the reaction of the host's organism rather than to any difference in the virulence of the parasites. This may have been influenced by meteorological factors such as frost accompanied by snow and rain which lasted till the end of the first third of June. It is suggested that such cases and especially their fatal termination can be prevented (1) by a general intensification of anti-malarial measures and (2) by earlier and more energetic treatment from the very first paroxysm.

C. A. Hoare

BERLIN B. M. Exogenous and Endogenous Manifestations in Malarial Psychoses. *Tr. d. Volotovskogo Meditsinskogo Instituta* [=Trans. Volotov med. Inst.] 1942 No. 21: 247-63. [In Russian.]

It is generally held that malarial psychoses represent an exogenous reaction which is characteristic for the given type of infection. They are most frequently manifested clinically as symptom-complexes of the Bonhoeffer type.

The present observations are based on 16 cases of psychoses in patients suffering from benign tertian (10), quartan (4) and subtertian (2) malaria. The author concludes (a) that there are no specific forms of psychoses associated with malarial infection though such psychoses may exhibit certain peculiarities and (b) that malarial psychoses can be provoked by any of the three types of malaria.

The clinical and psychopathological picture of malarial psychoses varies considerably. In most cases it manifests a reaction of the Bonhoeffer type but sometimes it assumes the character of exogenous reactions of an unusual type while in other cases malaria provokes an endogenous disorder (chiefly manic depressive psychoses). Furthermore there appears to be a biological affinity between the latter condition and malaria expressed in the cyclical form of both diseases and in disorders on the part of both the emotional sphere and the vegetative nervous system. In some cases the malarial infection does

not affect the character of endogenous psychosis while in others it becomes superimposed on the latter conveying to it an exogenous aspect in the form of a delirious syndrome *C A Hoare*

GALPERIN L P *Quinoline Compounds with Side Chain in Position 8*
Amer Rev Soviet Med 1944 Feb v 1 220 [Summary prepared for War Medicine Chicago]

Galperin says that among anti malarial compounds of the quinoline group synthesized in the Union of Soviet Socialist Republics numerous preparations have a diethylaminoalkylamine chain joined to the quinoline in position 8. The majority of these compounds have proved active against malaria. In the synthesis of chemical isomers with an identical chain joined in position 4 instead of 8 two questions arise first whether the anti malarial properties are preserved and second whether these preparations are analogous to quinine in acting specifically on the asexual forms of the parasite (schizotropic action) or whether their action is directed against the sexual forms (gametotropic action) as observed with the majority of compounds with the side chain in position 8.

The author found that four compounds quinolines 4b 50 52 and 56 with a diethylaminoalkyl chain joined to a 6 methoxyquinoline nucleus by an amino group in position 4 exert a schizotropic effect on avian malaria. The position of the diethylaminoalkylamine joined to the 6 methoxyquinoline determines the biologic action of the preparation in position 8 the preparation has both schizotropic and gametotropic properties and in position 4 schizotropic action only.

Preparations of this group are of interest as possible substitutes for quinine.

LOWE J *Novarsenobillon and Mapharside in the Treatment of the Attack of Malaria* *Indian Med Ga* 1944 Mar v 79 No 3 97-9 2 charts

NIVEN [this *Bulletin* 1942 v 39 258] has tested mapharside against naturally acquired infections of malaria in Malaya. He concluded that it had a dramatically rapid effect upon the sexual and asexual forms of *P. vivax* but was relatively inert against *P. falciparum* and *P. malariae*. Lowe treated about 20 cases of naturally acquired malaria. Nearsphenamine was given intravenously in three doses of 0.15, 0.3, 0.45 gm respectively at 4-5 day intervals. In cases of benign tertian malaria the parasites rapidly disappeared from the blood but relapses occurred as frequently as after treatment with quinine for one week. Moreover patients who had a latent infection with *P. falciparum* were not protected against this second infection. Only a few patients were treated with mapharside [mapharsen or *m*-amino-*p*-hydroxyphenylarsine oxide] the dose being 0.04 gm. This compound was probably slightly less effective than nearsphenamine.

In patients infected with *P. falciparum* neither nearsphenamine nor mapharside had any significant therapeutic effect. *F Hauking*

BOL. OFICINA SANITARIA PANAMERICANA 1944 Jan & Feb v 23 Nos 1 & 2 21-48 120-40 Terminología del paludismo (vocabulario) [Terminology of Malaria]

This is a glossary of terms in general use in all branches of malariaology. The terms are given in Spanish, English, French and Portuguese and are defined in Spanish.

DAS GUPTA B M & SIDDOVS L B Organic Arsenicals in the Treatment of Simian Malaria *Indian Med Ga* 1944 Mar v 79 No 3 99-101

Six monkeys weighing 14-2 kgm infected with *P. knowlesi* were treated with neoarsphenamine. Doses of 7.5-15 mgm of the drug given by daily intravenous injection had little or no parasitocidal action with doses of 60-90 mgm given by daily intravenous injection the infections were incompletely controlled. Treatment with 100 mgm removed the parasites but the animal died from the toxic effects. Six similar monkeys were treated with mapharsen (1: amino-*p* hydroxyphenylarsine oxide) in doses of 4-10 mgm for monkeys weighing 14-3 kgm no significant action against *P. knowlesi* was observed. F Haackin

SIDDOVS L B & BOSE A V The Action of 2 Chloro 7 Methoxy (8 Diethyl Amino Butyl) Amino Acridine on Simian Malaria *Indian Med Ga* 1944 Mar v 79 No 3 101-2

This compound differs from mepacrine in being a butyl acridine derivative while mepacrine is an amyl acridine derivative. The dosage given was 5-10 mgm daily for about three days to monkeys weighing approximately 2 kgm. Eight monkeys were treated. These preliminary results show that the compound had a powerful parasitocidal action upon *P. knowlesi* and comparative trial with mepacrine are contemplated. F Haackin

MAIER J & COGGESHALL L T The Duration of Immunity to Plasmodium knowlesi Malaria in Rhesus Monkeys *J Exper Med* 1944 Apr 1 v 79 No 4 401-30 7 charts 30 ef

With a view to determining how long monkeys retain immunity after a malarial infection a series of experiments was carried out in which after complete eradication of a *Plasmodium knowlesi* infection by administration of sodium sulphathiazole the monkeys were reinoculated after varying intervals. It has already been amply demonstrated that a *P. knowlesi* infection can be completely eliminated by a dose of 1 gm of sulphathiazole but in the experiments recorded here a total quantity of 4.6 to 6 gm was administered intraperitoneally in doses three times a day for three days in order to leave no doubt that the infection had been completely wiped out. In two cases the infection resulted from a standard dose of parasites was eradicated by the course of sulphathiazole commenced in the second and fourth day and three and ten weeks later reinoculation was carried out. In neither case was there any evidence of immunity the resulting infections developing as in normal monkeys and passing to a fatal issue. In other cases the infection normally fatal in every case was controlled by administration of quinine or immune serum in such a way that survival of the infection occurred. The infections were allowed to continue for about three weeks when they were eliminated by sulphathiazole. After a period of freedom from parasites lasting 37 to 414 days the monkeys were reinoculated. In all cases the thiazole was administered. From the character of the infections which resulted in every case it was clear that a considerable degree of immunity to reinfection existed except in one of two reinoculated on the 414th day. One monkey died of a typical acute infection whereas the other survived.

In another series of six monkeys the acute infection was controlled by quinine hydrochloride administered during the first week and the chronic infection resulting was allowed to run for 71 to 218 days when it was eliminated by sulphathiazole. Reinoculation was carried out in three monkeys after a 20 day period of freedom from parasites. All these failed to become infected. In the case of the remaining three monkeys of this series reinoculation was made after 289, 351 and 361 days. One of these developed a mild infection. The two others developed acute fatal infections. In another series of monkeys the acute infection was controlled by quinine or immune serum and the chronic infection resulting was eliminated by sulphathiazole after it had continued for two months or longer. Reinoculation carried out after a four week period of freedom failed to produce infection in three monkeys. Treatment with sulphathiazole was carried out to eliminate any possible undetected infection and a second reinoculation made after a longer interval. The process of treatment and reinoculation was repeated but after each treatment the interval before reinoculation was increased. When the interval was five weeks some (but not all) monkeys resisted reinfection and those that became infected survived. After fourteen weeks all reinoculated monkeys became infected and again all survived. In fact no deaths occurred till the interval was twelve months. After this some but not all of the monkeys died of acute infections indicating that some had no immunity remaining after twelve or more months. When the reinoculations were carried out with heterologous strains of *P. knowlesi* there occurred infections and death which would not have been expected if the strain reinoculated had been the homologous one. Nevertheless there was some indication that a partial cross immunity existed between the strains.

From the results outlined above it is clear that after sterilization of the chronic infections there is persistence of partial immunity up to about one year as indicated by the recovery of the animals after mild or moderately severe infections. The end point at which immunity disappears seems to be independent of the length of the chronic infection though this undoubtedly influences the degree of immunity while it lasts. The experiments detailed in the paper have been carefully carried out and the course of the infections has been followed by daily blood examinations and parasite counts. In addition the complement fixation titres were determined by the method of Coggeshall and Eaton.

The paper is a long one which is well worth careful study as it establishes beyond doubt the fact that after complete recovery from a malarial infection an existing immunity may last for as long as one year.

C M Wenyon

THOMPSON P C & HUFF C G. A Saurian Malarial Parasite *Plasmodium mexicanum* n sp. with both *Elongatum* and *Gallinaceum* Types of *Exoerythrocytic* Stages. *J Infect Dis* 1944 Jan Feb, 54 No 1 48-67 5 figs & 2 pls (1 coloured) [Refs on pp 78-9]

— & —. Saurian Malarial Parasites of the United States and Mexico. *Ibid* 68-79 1 fig [Numerous refs]

A study of the North and Central American lizards has resulted in the discovery of a number of malarial parasites which are the subject of these two papers.

In the first the authors give a detailed description of a new species—*Plasmodium mexicanum* from the lizard *Sceloporus ferrugineus* from Mexico. Of 61 specimens examined 23 harboured the parasite. A strain isolated by the inoculation of the collared lizard *Crotaphytus collaris* was inoculated to the common horned lizard *Phrynosoma cornutum*, the Texas shiny lizard *Sceloporus olivaceus* and the common fence lizard *Sceloporus undulatus*. Soon after the infections were established it was noted that a wide variety of cell other than red blood corpuscles were infected. In fact this was the first instance in which erythrocytic stages of a saurian malarial parasite had been noted. There are two types: the described for *Plasmodium* of birds in which the parasites occur in a great variety of blood and blood forming cell and the commonly found in *Plasmodium gallinaceum* which occur in reticulocytes and true endothelial cells. The proportion of the two types varies with the different hosts. *P. mexicanum* resembles in many respects *Plasmodium* described by SCHWETZ in 1931 from *Mastomys natalensis* in the Belgian Congo. In this form however erythrocytic forms were not recorded while it differed in other respects. Thus it occurred in a lizard of the family Scincidae while attempts by the author to infect three species of this family with *P. mexicanum* which occurs in members of the family Iguanidae have failed.

In the second paper other saurian parasites are described. A new species *Plasmodium* from *Iguana uana lineolata* of Mexico closely resembles *Plasmodium* of *Iguana sapidissima* of Trinidad. It differs however in that about 24 per cent of the trophozoites possess one or two long slender cytoplasmic processes which may be bifurcate at the end. This feature occurs not only in the original host but also in *Sceloporus undulatus* which was successfully infected. Another new species is *Plasmodium floridense* of *Sceloporus undulatus* from Florida. This form resembles *Plasmodium* of *Toposaurus* *triquetus* and *Plasmodium* of *Stenocercus* sp. It was successfully inoculated to *Crotaphytus collaris*, *Crotaphytus* and *Aolis carolinensis*. Of a number of *Aedes aegypti* and *Culex pipiens* fed on infected lizards the sole indication of development was the formation of a single oocyst in an *Aedes aegypti* fed on a lizard infected with *P. floridense*. About 150 *Aedes aegypti* and *Culex pipiens* were allowed to feed on *Iguana lineolata* and *Sceloporus undulatus* infected with *P. mexicanum*. For some unknown reason the mosquitoes died within 24 hours. *Culex pipiens* fed on uninfected *Sceloporus undulatus* lived normally. It is suggested that *P. mexicanum* is lethal to mosquitoes. In addition to the well-defined malarial parasites noted above other less well defined pigmented parasites were seen as also certain unpigmented forms. An organism resembling *Sestelia hominis* described by BRUMPT in 1910 and a similar form seen by HUFF in the blood of a canary in 1939 was met with in the lizard *Phrynosoma cornutum*. In *Aolis carolinensis* numerous unsheathed microfilariae were noted. The two papers are illustrated by two plates, one in colour and give a list of references to literature dealing with malarial parasites of lizards.

C. W. HENYON

TRYPANOSOMIASIS

VANDERPLANK T L Identification of Trypanosomes by Chromosomes
[Correspondence] *Nature* 1944 July 1 19-20

This is a preliminary note of an investigation into the structure of the nucleus of trypanosomes limited so far to *Trypanosoma rhodesiense* and *T. congolense* trypanosomes in blood smears and also in the saliva of tsetse flies were used. The author hopes to publish a fuller account later. The findings are best given in an abstract by quoting his own words.

Mitosis occurs in both species. *T. rhodesiense* has two types of individuals, one homoploid with two paired and two unpaired chromosomes ($N = 6$) and the other heteroploid with two paired and one unpaired chromosomes ($N = 5$). *T. congolense* has also been observed to have two types of individuals, one with three paired chromosomes and the other with three paired and one unpaired chromosomes.

It appears, although this is not yet confirmed, that meiosis may also take place, the unpaired chromosomes acting like the sex chromosomes of other animals, and that gametes are thrown out by the meiotic trypanosome.

J F Corson

VAN EMDEN F I A New Sub Species of *Glossina* from Uganda (Diptera) *Bull Entom Res* 1944 July v 35 Pt 2 193-6
5 figs

A new subspecies of *Glossina nigrofusca* is described and named *Glossina nigrofusca hopkinsi*. Its special characters were observed by G. H. E. HOPKINS and T. W. CHORLEY in November 1939 in tsetse caught in the Bwamba area, Toro, Western Uganda, where it was found mixed with *G. fusca congolensis* and *G. fuscipleuris*. Two specimens were sent to the author to check the identification.

Reasons are given for deciding that it is a subspecies of *nigrofusca* and not a race of *fusca*. The description is illustrated by the following drawings: the third antennal segment of the new tsetse and of *nigrofusca*, male terminalia of the former and of *G. fusca congolensis*, the female signum of the new subspecies. A key for identification is also given.

The following localities in Western Uganda are mentioned: the Mutande, Makusakusa and Rumanye rivers, Mahoka, Mpulia. Two female specimens sent from the Ituri region, Stanleyville, Belgian Congo, are in the British Museum.

J F Corson

DIOS R. L. & DE SOMMERVILLE E. T. W. Observaciones realizadas con cepas de *Trypanosoma cruzi* Chagas 1909 conservadas sobre ratones blancos [Observations on Experimental Infections of Mice with *T. cruzi*] *Rev Inst Bacteriológ* Dr Carlos G. Malbran, Buenos Aires 1943 Dec v 12 No 1 37-59
English summary

The authors describe the results of observations on experimental infections of white mice with *Trypanosoma cruzi*. The data are based on work carried out during 18 years with 2,413 mice using 29 Argentine strains of the trypanosome, 20 of which were isolated from infected triatomid bugs and nine from human cases. The inoculations were in all

The bite produces a clinical syndrome strongly suggestive of cellulitis with lymphangitis are regional lymphadenitis areas of the body exposed in sleep (face arms hands) are most likely to be affected

Shallow incision of the swollen bite site seems to have a favorable effect on the course of the symptoms

The bug's presence in Hawaii constitutes a public health hazard since it is an important vector of American trypanosomiasis

LEISHMANIASIS

COLE A C E Kala Azar in East Africa *Trans Roy Soc Trop Med & Hyg* 1944 May v 37 No 6 409-35 [14 refs]

In an earlier paper [this *Bulletin* 1942 v 39 746] the author with COSGROVE and ROBINSON gave an account of experiences with 29 cases of kala azar in the King's African Rifles which became infected in 1941 in the area north and west of Lake Rudolph near the Omo river an area in the vicinity of Kapoeta where sandflies occur in large numbers. In the present paper he gives an extended description of these cases together with 8 other cases seen in 1941 and 23 in 1942. It appeared that the patients in the two additional groups contracted the infection on or near the Addis Ababa Nanyuki road somewhere in the vicinity of Marsabit. The author was also informed by HEISCH that he had diagnosed cases which indicated a source of infection on the Uaso-Nyero river which crosses the Isiolo Marsabit road at Archer's Post.

It was possible to make fairly accurate observations on the incubation period of the disease as in many cases the date of exposure to infection was known. This was from 2 to 4 months which indicated an infection in the period March to June the rainy season in the area concerned for admissions occurred during the four months June September. The majority of patients gave a story of fever and malaise either sudden or gradual in onset. Abdominal pain either located over the spleen or liver or diffuse was the primary complaint in 20 cases. Others complained of pain in the chest or cough while diarrhoea or dysentery was common. The fever was characteristically irregular but periods of apyrexia of more than 24 hours duration were not observed. In spite of the fever with a temperature rising at times to 103° or 104° F in the majority of cases there was a remarkable degree of physical fitness. Extreme enlargement of the spleen was a relatively late sign. Though the patients were not admitted absolutely at the beginning of the illness in 11 the spleen was not palpable and in 12 it was enlarged only a finger's breadth. As regards the liver the enlargement followed that of the spleen on admission. 44 patients had no enlargement. Glandular enlargement involving all groups of glands occurred in half the cases. Damage to the kidneys probably the result of continued fever was frequent occurrence. In 40 cases in which the urine was examined albumin and granular casts were present. Complications included haemorrhage diarrhoea bronchitis and pneumonia pharyngitis anaemia and oedema.

In differential diagnosis undulant fever which is accompanied by long continued irregular fever leucopenia and splenic enlargement is

considered to bear the closest resemblance to kala azar. A feature of many cases was a rash which appeared on the face and which extended in some cases to the trunk and arms and to the lower part of the body. It recommenced as a miliary eruption which might progress into larger papules. These in some cases became transformed into plaques resembling a lichen or even into warty growths [see also COLE this B. L. 1943 v. 40 229]. Scrapings made from the lesions in 12 cases revealed leishmania in 8. It is noteworthy that the rash was seen only once in 22 fatal cases and 17 times in 38 patients who recovered. In all cases the rash had disappeared before the patients left hospital.

Of the 60 patients 22 died but the death rate of 36 per cent in the 1941 cases was reduced to 13 per cent in 1942 owing to the better supply of drugs in the later period. The causes of death apart from the leishmania infection itself were dysentery, myocardial failure, pericarditis, pneumonia, typhoidal state, asthenia and anaemia.

As regards the presence of parasites these are scanty early in the disease but may become incredibly numerous. They are not invariably commonest in any one organ and a negative result should be followed by examination of others. From the point of view of convenience and lack of trauma it is best to begin with gland puncture and if this is negative to pass on to the spleen or marrow. Liver puncture is probably only of value when the organ is grossly enlarged. Skin scrapings should always be examined if a rash is present. It was found that the formal gel test was negative in 21 early cases. In late cases where pyrexia had lasted three or four months it became positive.

On the subject of treatment the author stated that the response to tartar emetic was similar to that reported for Sudan cases; it should never be used if other drugs are available. With antihomaline given intramuscularly two cases were treated successfully. The drug is useful when intravenous therapy is difficult or impossible. Large dosage is necessary such as 4 cc. on alternate days up to a total of 60-80 cc. Urea stibamine proved to be the most valuable drug. The course recommended for normal cases is 14 daily intravenous injections of 0.05, 0.1, 0.15, 0.2, 0.2, 0.2 etc. to a total of 2.5 gm. Nine patients were treated with this course and none relapsed. Three with a long history, large numbers of parasites, low state and anaemia died with some exacerbation of symptoms after the 6th or 7th injections. Five patients who had relapsed after urea stibamine (inadequate dosage) diamidino stilbene, tartar emetic and multiple treatments were successfully treated with an intensive course of urea stibamine. This consisted of 0.1 gm. the first day, 0.2 the second and 0.3 gm. daily thereafter the whole course lasting 10 days giving a total dosage of 2.7 gm. The temperature fell in three to five days and there was rapid shrinkage of the spleen. No relapse occurred.

With diamidino stilbene [Stibamidine] 14 cases were treated. The dosage was about 1 to 1.3 gm. in 12 injections spread over 14 to 30 days. Of the 14 cases 7 were cured, one after a repeated course. Of the 7 not cured several courses had been tried in some. It is admitted that the dosage may have been inadequate. The reason for this is the relative insolubility of the drug which requires injections of more than 10 cc. for doses above 100 mgm. and the unpleasant effects such as tightness in the chest, feeling of fire along the veins, vomiting, great depression and collapse due to a drop in blood pressure. In one case however a cure was obtained by an intensive course of 50 mgm, 100 mgm, 150 mgm and then 200 mgm daily to a total of 2.5 gm.

In addition to specific therapy symptomatic treatment is necessary. The most important is blood transfusion which is particularly necessary in severe secondary anaemia with oedema epistaxis and other bleedings from the mucosae. Small transfusions of 1 pint are helpful but continuous drip transfusion is recommended till a figure of 50 per cent haemoglobin at least is reached. Specific drugs can be added to the drip. At the same time every opportunity should be taken to improve the wasted condition with meat and a diet rich in vitamins. A cure can fairly safely be assumed if relapse has not occurred within 2½ months of completion of a course which has brought about cessation of fever improvement in general condition reduction in the size of the spleen improvement in the blood picture and disappearance of parasites.

C M Wenyon

BURKE E Abdominal Pain in the Diagnosis of Early Kala-Azar
Trans Roy Soc Trop Med & Hyg 1944 May v 37 No 6
441-5

The author who has had a long experience of kala azar on tea estates in Assam was struck by a reference to abdominal pain as a symptom of kala azar in a paper by COLE COSGROVE and ROBINSON describing an outbreak of the disease in a battalion of the King's African Rifles [this *Bulletin* 1942 39 746]. In his own experience of some 7 000 cases of the disease he has come to regard abdominal pain as if not a diagnostic sign at least one which should give rise to suspicion and justify the keeping of a patient under observation for the development of other signs of kala azar. He states that it occurs in 2 or 3 per cent of all cases.

C M Wenyon

SHELLIM M A An Unusual Case of Kala Azar successfully treated with Stilbamidine
Trans Roy Soc Trop Med & Hyg 1944 May v 37 No 6 447-9

The case described is that of a corporal in the Greek army who appeared to have contracted the disease in the Greek island of Ikaria. The unusual feature was the fact that the spleen was not palpable while the liver was enlarged. This gave rise to suspicion of hepatitis for which emetine was given. During this treatment it was noticed that the temperature showed a double daily rise. Sternal marrow and venous blood were inoculated to Locke's blood agar. In all the tubes cultures of leishmania were obtained. The case was successfully treated with two courses of stilbamidine each of 2 gm with an interval of 17 days between the courses. The serum protein analyses were of interest because of the high globulin albumin ration after the first course of treatment.

C M Wenyon

ELMES B G T & HALL R N Cutaneous Leishmaniasis in Nigeria
Trans Roy Soc Trop Med & Hyg 1944 May v 37 No 6
437-9 3 figs on 1 pl

The authors write that Nigeria is included in the geographical distribution of cutaneous leishmaniasis by CRAIG and FAUST (*Clinical Parasitology* 1937 p 128 Philadelphia Lea & Febiger) and by MANSON BAHR (*Manson's Trop Dis* 1940 11th edn p 197 London Cassell & Co) but for many years there has been considerable

local doubt as to its existence. In the present paper they report ten cases which were seen at Kano during 1943 in all of which *Leishmania tropica* were demonstrated. In all cases the lesions conformed to the text book description of oriental sore. The authors mention some earlier records but they doubt whether a diagnosis was established by the discovery of *Leishmania*. [They fail to mention a case reported from Kaduna by the late Dr DYCE SHARP (this *Bulletin* 1925 v 22 606). In this case the reviewer can vouch for the presence of *Leishmania* in films made from the sore.] C. M. Henyon

FEVERS OF THE TYPHUS GROUP

BOL. OFICINA SANITARIA PANAMERICANA 1944 Mar v 23 No 3 706-9 [English summary 209] Las rickettsiasis en la America Latina [Rickettsial Diseases in Latin America]

Reports from the members of the Pan American Sanitary Bureau Committee on Typhus showing the distribution in their respective countries of Rocky Mountain spotted fever and the typhus group cover 791 cases of the former and 9625 cases of the latter occurring in recent years. Brazil has reported 663 cases of spotted fever in the fourteen years 1929-42 occurring in 36 localities of three States (Rio de Janeiro Minas Gerais and São Paulo) the heaviest incidence being in 1940-41 (5 and 106 C) the report is admittedly incomplete and covers only the severe forms of the disease the mortality rate is estimated at as high as 80 to 90 per cent. Statistics for certain periods from 1934 to 1943 in Colombia include 128 C 123 D in seven localities in two Departments (Cundinamarca and Santander del Sur). With regard to typhus fever (type not specified except for Cuba where all cases were of the murine type) Brazil reported 4 probable cases in 1941 (São Paulo) Colombia 68 cases in 1942 and the first quarter of 1943 in 40 municipalities in six Departments (Antioquia Caldas Cundinamarca Boyacá Narino and Valle) with a case fatality rate of 10 to 17.4 per cent in hospital cases. Cuba 24 C 5 D 1939-1942 in 10 localities mostly in the provinces of Habana and Pinar del Rio all were of the murine type and 3 strains were isolated. Ecuador 51 C 81 D 1940-42 (there have been cases since 1940 in 11 provinces 3 strains of the epidemic type have been isolated) and Mexico 819 C from 1938-1942 with 750 C in Mexico City in 1942 (mortality rate for the capital estimated at 14 per cent) cases were reported from 31 States and territories and the Federal District but principally from the temperate plateau (Mexico Hidalgo Puebla and Tlaxcala) both the murine and epidemic forms have been observed.

ALF. LADEJO L. Tifus y otras rickettsiasis exantematicas [Typhus and other Rickettsial Diseases] Segunda Edición. Opusculo sobre el estigadío y clínico. 109 pp. 18 figs. 1941 Madrid Ediciones Morata

A general account

BEVAN C de V Cultivation of South African Rickettsiae in Developing Chicks and the Preparation of Vaccines from their Membranes *South African J Med Sci* 1944 Feb v 9 No 1 1-20 19 text figs & 4 figs on 1 pl [18 refs]

This is a report on experiments carried out as a preliminary to the preparation of egg vaccines. The technical details will be found interesting by those engaged on similar work.

Some of the points brought out in the report are as follows. Rickettsiae in yolk sac smears show up better if the preparation is cleared by benzene before fixation with methyl alcohol. A modification of the Machiavello method of staining is described. Infected tissues dried and sealed *in vacuo* retain their infectivity after six months storage at 0 to 4 C and can be used during at least that period thus obviating the need to maintain strains in guineapigs.

South African strains of epidemic, endemic and tick borne typhus Rickettsiae were used.

Weak egg vaccine prepared in the way described in the paper from epidemic Rickettsiae gave negligible protection to guineapigs against infection with the same strain. Vaccine similarly prepared from endemic Rickettsiae gave partial protection against the homologous strain and tick borne rickettsial vaccine gave complete protection against its own strain of infection.

A strain of epidemic Rickettsiae became much more virulent to guineapigs after being passaged 28 times through eggs. The incubation period was shortened to one or two days instead of the usual six to nine and an intense orchitic reaction was caused. It was found that guinea pigs were susceptible to this virulent strain even after having been previously immunized by being vaccinated and then infected with living epidemic Rickettsiae of normal virulence. The febrile reactions were less intense but did occur.

The immunity conferred by endemic and tick borne rickettsial vaccines also broke down and failed to protect guineapigs against infection with homologous strains whose virulence had been increased by repeated passages through eggs.

When more concentrated vaccines were used the breakdown of the immunity was prevented to some degree but in the case of epidemic strains it was found that still greater concentrations would be needed.

The author prefers egg vaccines to those prepared from mammals especially in the case of the tick borne Rickettsiae which do not thrive well on mammals but grow luxuriantly on eggs.

John W D Meaw

NYKA W A Method for Staining the Rickettsiae of Typhus in Histological Sections *J Path & Bact* 1944 Apr v 56 No 2 264

Hitherto no satisfactory method of staining the rickettsiae of typhus has been described. The following technique has been found to give good results.

1 Fix small pieces of tissue in Muller's fluid. Embed in paraffin and cut thin sections 1-3 μ .

2 Stain for 5-10 minutes in 5 per cent basic fuchsin in 90 per cent alcohol (Basic fuchsin 5 g 90 per cent alcohol to 100 ml). This solution keeps well and sections may be left in it for days without affecting the final preparation.

3 Rinse rapidly in tap water. Differentiate in 90 per cent alcohol for 1-2 minutes.

- 4 Stain for 1-3 minutes in 1:10,000 aqueous methyl violet
 5 Rins in tap water, differentiate thoroughly in 1:1,500 acetic acid
 6 Dihydrate naphthol alcohol solution clear in xylol and mount in DPX4 mounting medium (Medi-Manufacture Co.)

Cytoplasm and erythrocytes are stained pale yellow or pink, rickettsiae and nuclei are violet. The Rickettsiae are seen lying scattered among the cell or in clumps inside the cells.

Satisfactory sections have been obtained from mouse lung and from chicken embryo yolk sac. The results depend on the quality of the fixation of the tissue.

J. F. Corson

PSHENICHNOV, A. W. [Current Problems of Typhus Fever] *Trudy Molotovskogo Meditsinskogo Instituta* [=Trans. Molotov Medical Inst.] 1944, No. 21, 227-33. [In Russian.]

The Soviet health authorities are determined to do their utmost to eradicate typhus fever throughout the Union. It is realized that this object can be attained only if all the epidemiological factors affecting this disease are known, especially the reservoirs of infection in endemic foci. A critical account is given of some of the views held on this question. One of the chief is that the infection can be carried by animals other than man and louse. However, all attempts to incriminate various mammals as reservoir hosts have failed, while endemic typhus fever in rat has been shown to be independent of the human disease. It has also been suggested that the virus is retained in clinically symptomless human carriers, but so far there is no evidence to support this view. The author believes that even if a latent infection occurs in man, it is too slight to be taken up by lice and is consequently of no epidemiological significance.

There remains the possibility that the virus is preserved in the louse. The observations recorded in the present paper are devoted mainly to the solution of this problem. In the course of these investigations the author used only laboratory-bred lice, which were infected either by feeding on patients or by an improved Weis's method. The criteria of successful infection were the finding of Rickettsiae in smears of louse guts and the reproduction of the disease in guinea pigs.

In the course of these experiments the possibility of hereditary (transembryonic) transmission of the virus in lice and their infection through cannibalism were tested. However, in the first case, teased-up larvae and nymphs descended from infected lice failed to infect guinea pigs when inoculated into them. In the second case, healthy lice of one sex when kept together with infected lice of the opposite sex failed to become infected. The author then considers the infection of healthy lice with the remains of infected lice crushed on human skin. Infection was successfully produced under experimental conditions by allowing clean lice to feed on immune persons whose skin was smeared with emulsions of infected lice. By this peroral method the infection was passed through successive batches of lice without loss of virulence. Although lice crushed on the human body or clothing provide similar opportunities, it was thought that under natural conditions the infection is spread from louse to louse through the faeces, as suggested by some earlier workers. Since this view is not generally accepted, the author has made a series of investigations with a view to its verification. He has demonstrated (1) that masses of Rickettsiae are present in the droppings of infected lice from the 3rd to the 17th

days after the infecting feed and (2) that such faeces when emulsified in saline and smeared on the skin of immune persons are capable of infecting clean lice perorally when these feed on the contaminated area.

The author is convinced that peroral infection occurs among lice living on heavily infested persons and that such lice represent the reservoir of human infection during the inter epidemic period. It is also suggested that the peroral method of infection of lice might be used with advantage for experimental purposes instead of Weigl's method.

The author holds that typhus fever is transmitted to man through the faeces of lice exclusively and that infection can take place even in the absence of the insects themselves provided there is faecal contamination.

This raises the question as to the length of time during which the droppings remain infective in the external medium *e.g.* on clothing etc. Regarding this point opinions also vary. The author's observations conducted under natural conditions have shown that the virus dies rapidly (a) on the skin (2-24 hours) (b) in the incubator at high humidity (3 hours) and (c) in dead lice at room temperature (6-72 hours). It remains viable for longer periods in the dry faeces of lice (5-20 days) on the underwear (10 days) and under the finger nails (4 days). However the most favourable conditions for the survival of the rickettsiae in dead lice and in their droppings are provided at low temperatures thus in the open during the winter frosts they proved to be viable up to four months. These observations are of considerable epidemiological importance if it is taken into consideration that lice constantly foul the skin and clothing of their human host with their droppings the latter are easily introduced under the finger nails when the patient scratches himself and minute particles of the faeces may find their way on to the conjunctiva and other mucous membranes. These facts also throw light on infections occurring among the medical personnel without any evidence of infestation by lice. In this connexion the author insists on personal prophylaxis which would afford protection not only against the lice but also against their excrement. He draws attention to the inadequacy of the usual methods of disinfection which succeed in delousing the clothing but do not always destroy the Rickettsiae of typhus fever.

As regards the bearing of the above observations on the nature of the endemic focus of typhus fever the author maintains that the epidemic process is continuous its apparent extinction being due to failure to recognize certain cases of infection. As the result of incomplete sanitary precautions the Rickettsiae can be preserved in lice and transmitted by them to healthy insects perorally. Finally in an apparently extinct focus the Rickettsiae can be preserved for long periods of time in a passive state *e.g.* in the faeces and dead bodies of infected lice deposited in the clothing of patients. They will thus serve as the starting point of a fresh outbreak.

C A Hoare

AGNEW A P & KYLES W B Typhus Fever in Great Britain *Brit Med J* 1944 July 1 10-11

This case of typhus fever occurred in a patient aged 24 who was one of 19 men admitted to hospital on January 5th 1944 from a ship that had sailed from a typhus infected area on December 20th 1943.

All the men had become ill during the voyage and a number of them including the patient had acute respiratory infections attributed to influenza.

The patient was reported to have had fever with cough on December 31st when the temperature rose to 102 F. By January 2nd his temperature had fallen to normal but two days later the temperature rose again to 101.2 F and bronchitis was diagnosed.

On admission there was severe headache, sore throat and cough before being put to bed the patient had a sharp rigor with collapse and a temperature of 103 F. Next day, January 6th, the face was flushed, the conjunctivae were injected and there was a non-adherent exudate on the throat but satisfactory response to penicillin for *C. diphtheriae* and haemolytic streptococci. Slight generalized adenitis and rigidity of the neck were observed. On January 7th there were drowsiness, restlessness, increased rigidity of the neck, more intense bronchitis and impairment of hearing. [See also this Bulletin 1943, v. 40, 382.] On January 9th the condition had become worse and a macular rash consisting of about 40 spots of 2 to 3 mm diameter was detected on the flanks and shoulders. On January 10th the Weil-Felix test was carried out and the titre with P OX19 was found to be 1-4,000.

From this date the temperature fell gradually and became normal on January 17th.

On January 10th the Weil-Felix titre was 1-12,800 and on February 1st it was 1-6,400.

The onset was assumed to have been on January 4th or 5th and the earlier symptoms were regarded as being due to a prodromal state or to influenza.

No lice were found on the patient or on contacts. None of the other patients developed a positive Weil-Felix reaction and there were no secondary cases.

In addition to the usual measures of control attendants wore masks to guard against droplet infection and care was taken in handling the blood and sputum.

Attention is called by the author to the need for recognizing the possibility of typhus fever in unusual cases of this kind.

J. N. W. D. McLean

BEGG, A. M., FULTON, F. & VAN DEN ENDE, M. Inclusion Bodies in association with Typhus Rickettsiae. *J. Path. & Bact.* 1944 Jan. 56 No. 1, 109-13. 13 figs. (10 coloured) on 3 pl.

This paper is illustrated by ten excellent coloured drawings and three photomicrographs taken by ultra-violet light. It deals with the interpretation of the inclusion bodies and other forms of typhus Rickettsiae found in smears from the lungs of rabbits and rats which had been infected by the intra-nasal route with suspension of infected mouse lung.

The observations made by GIROLD and PANTHIER on the same subject are mentioned [this Bulletin 1942, v. 39, 733-734, 1943, v. 40, 764].

The suspensions used were made from the hepatized lungs of mice in which enormous numbers of discrete *Rickettsia p. o. a. ch.* occurred as the result of increased virulence of the infection caused by repeated passages by the intra-nasal route. Rabbits infected intranasally by the suspensions remained free from illness but homogeneous rounded

bodies were found in smears from their lungs these bodies were of various sizes and were stained red by Machiavello's method After a series of passages through the lungs of rabbits progressively increasing signs of consolidation appeared and clusters of Rickettsiae (morulae) were found in addition to the homogeneous bodies After further passages discrete Rickettsiae were also found at first these were large but gradually they became smaller and much more numerous

When rats were infected by the intranasal route with mouse lung Rickettsial suspensions of the murine type intense consolidation was caused in the first passage morulae and discrete Rickettsiae were found in the lung smears but there were no homogeneous bodies

From these and other experiments the authors conclude that the homogeneous bodies appear only during the period of adaptation of the Rickettsiae to a new host They leave it an open question whether the bodies are as suggested by Giroud and Panther forms of degeneration or early stages of morulae They mention that photographs by ultra violet light favour the former interpretation

John W D Megaw

Louw A H *Mercurochrome in Typhus* [Correspondence] *South African Med J* 1944 June 10 v 18 No 11 204

Louw suggests that the treatment of typhus with intravenous mercurochrome (2-4 cc of a 1 per cent solution daily for six days) together with a high vitamin diet and vitaminized oils should be given a trial In a few cases in his hands this treatment has shown promising signs it was described by GIUSTA and DIGNAZIO [this *Bulletin* 1939 v 36 989]

Charles Willocks

MOPAGUES V PINKERTON H & GREIFF D *Therapeutic Effectiveness of Penicillin in Experimental Murine Typhus Infection in dba Mice* *J Exper Med* 1944 Apr 1 v 79 No 4 431-7

Two of the authors Pinkerton and Greiff have already found that penicillin strikingly inhibits the growth of murine Rickettsiae in yolk sac cultures The report of this finding was under publication at the time of writing

The present article deals with experiments on dba mice (an inbred strain) in conditions in which the untreated animals die of infection by murine typhus [see this *Bulletin* 1944 v 41 pp 557-558]

Six lots of mice each consisting of 10 to 14 animals were used half of each lot served as controls

In two of the lots of mice the dose of infection was such as to cause a rapidly fatal illness in the untreated animals in these penicillin had little or no effect except that in one of the lots the incubation and survival periods were prolonged by about one day

In one lot of mice infected with a moderate dose of Rickettsiae which caused the death of the six controls after survival periods of seven to eight days treatment with penicillin in daily doses of 930 units given intraperitoneally in divided doses and starting seven hours after infection completely protected the six treated animals from illness

In another lot of animals the illness was rather less severe in the seven control so that one of them survived in this experiment 640 units of penicillin given daily and starting 48 hours after the infecting dose modified the severity of the attacks in the treated mice five of which survived one was killed for examination and the seventh died of post partum haemorrhage.

In one lot of 12 mice in which all the six controls died after survival periods of 4½ to 5½ days there were three survivors among the six animals treated by 1 100 units of penicillin daily beginning six hours after the infecting dose.

There were two survivors among six mice treated by 830 units daily starting 24 hours after the infecting doses all six controls died.

All the deaths among treated and untreated mice were found to have been due to Rickettsial infection secondary bacterial invasion was completely excluded.

In most of the experiments there was an interval during the night of 12 hours between two of the five to seven divided doses so that the concentration of the drug was probably not maintained at an effective level throughout the 24 hours.

The author concludes that it would seem reasonable to expect a beneficial therapeutic effect from penicillin in human cases of typhus they suggest that the treatment should be started as early as possible and that the doses should be rather larger than those used in bacterial infections. More prolonged treatment would also be probably needed.

In view of these findings it is likely that penicillin will be tried in the fevers of the typhus group. Intravenous administration would seem to be most suitable because of the special distribution of the Rickettsiae in the walls of the blood vessel. *John H. D. McArthur*

GREIFF D & PINKERTON H. Inhibition of Growth of Typhus Rickettsiae in the Yolk Sac by Penicillin. *Proc Soc Exper Biol & Med* 1944 Feb 1 55 No 2 116-19.

This is an account of the experiments which led up to the trial of penicillin in mice experimentally infected with typhus Rickettsiae as described above.

Eleven yolk sac cultures of a murine strain of Rickettsiae were treated by injections of the sodium salt of penicillin into the yolk sacs. The injections were started on the 2nd or 3rd day after inoculation with the infected material. The same number of untreated eggs served as control. The effect of the drug was estimated by making smears of the yolk sac membranes and after staining the films counting the number of Rickettsiae seen in each oil immersion field.

The majority of the controls died with heavy rickettsial infection between the 11th and 13th day after inoculation. One died on the 4th day before multiplication of the organisms had begun three had 10-100 in each field two had 100-1 000 five had 1 000-5 000 and one even had 5 000-8 000.

Among the penicillin treated eggs four died on or before the 6th day but no recognizable Rickettsiae were seen nine had less than one in each field three had 1-10 one had 100-1 000 and one had 1 000-5 000.

Two guinea-pigs were inoculated with material from two heavily infected control eggs and two with material from two penicillin treated eggs containing less than one *Rickettsia* in each field all four animals developed typical murine typhus so that the drug was regarded as acting by inhibiting the growth of the organisms not by destroying them

It appeared that the inhibition was caused by penetration of the drug into the cells [of the yolk sacs] and not entirely by its direct action on extracellular organisms in the process of passing from cell to cell

John W D Megaw

BULL U S ARMY MED DEPT 1944 May No 76 52-61 8 figs
Scrub Typhus

Because of the practical importance of mite borne typhus to troops operating in the South Pacific area a team of American investigators went to New Guinea in September 1943 to study the disease all except the Field Entomologist returned home about the end of December They brought back strains of *Rickettsia orientalis* which are being studied at the Army Medical School the Naval Medical Research Institute and the National Institute of Health with a view to preparing a vaccine if this should be possible

The organism is easily isolated during the early stages of the disease as follows a small portion of blood clot is ground up with normal saline and centrifuged at low speed 0.3 cc of the supernatant fluid is inoculated intraperitoneally into mice and this is followed by their death 10-16 days afterwards smears from the peritoneum stained with Giemsa's stain show *Rickettsiae*

The larval form of the mite feeds on the rat or bandicoot in New Guinea and man is only an accidental host the species of mite which transmits the disease cannot yet be definitely stated but apparently it is not the itch mite since little if any correlation was found between the incidence of scrub itch and the frequency of infection with scrub typhus each being found in the absence of the other

Little is known of animal reservoirs of the disease rats and bandicoots were numerous and harboured mites and these were also found on lizards and birds No seasonal incidence was observed the risk of infection appeared to be greatest at the border between the kunai grass and the jungle

The incubation period is about 10-18 days The onset is sudden with headache and fever which rises slowly during the first week remains steady during the second and subsides by lysis during the third The headache becomes quite severe An eruption of dull red macules appears on the 5th to 8th day The lymph nodes enlarge The primary lesion is an ulcer covered with a black scab The agglutination test with *Proteus* OXA confirms the diagnosis but *Rickettsiae* have been isolated from the blood in patients whose sera gave a negative agglutination test

With regard to treatment it is stated that penicillin employed in maximum dosage had no effect on the course of the disease [see MORAGUES PINKERTON and GREIFF above] As hypochloræmia frequently develops common salt should be given 6-8 gm daily

Preventive measures at a camp site consist of cutting and burning the long kunai grass followed by burning over the site with a powerful

oil sprayer. Personal prophylaxis includes sleeping above the floor level and taking a bath as soon as possible after exposure to infection.

J. F. Corson

PLOTZ H. REAGAN R. L. & WERTMAN H. Differentiation between Boutonneuse and Rocky Mountain Spotted Fever by means of Complement Fixation. *Proc Soc Exper Biol & Med* 1944 Mar 33 No 3 173-6

In this paper a complement fixation test is described by which the related diseases Rocky Mountain spotted fever (hereafter referred to as RMSF) and boutonneuse fever (BF) can be differentiated from each other.

The antigenic relationship between the two diseases had been demonstrated by BADGER who in 1933 found that a cross immunity occurred in guinea pigs. *Bull* 1933 v 30 895 but DAVIS and PARKER in 1934 found that a vaccine which protected guinea pigs against RMSF did not protect them against BF. *this Bull* 1934 v 31 633

The RMSF antigen used in the present tests were made from Rickettsiae grown in tissue cultures on a agar. The BF antigens were prepared from yolk sac cultures by the method already used by PLOTZ in connexion with corresponding tests for differentiation between epidemic and endemic typhus. *this Bu* 1943 v 40 443

In preparing the antigen by inactivating the Rickettsiae with 5 per cent formalin centrifugation and washing four times in saline—it was found that the supernatant fluid in each case contained a soluble antigen and that when this was used in carrying out the test the BF antigen gave the same positive response with RMSF serum as it did with BF serum.

A corresponding degree of cross fixation also occurs between epidemic and murine typhus in guinea pigs when soluble antigens are used.

With the insoluble antigens obtained from washed Rickettsiae the results were quite different. The sera of six guinea pigs convalescent from BF reacted with the homologous antigen at titres ranging from 1-20 to 1-160 but gave negative responses with RMSF antigen.

So also three lots of pooled sera of guinea pigs convalescent from RMSF reacted at titres of 1-80, 1-80 and 1-160 with the homologous antigen and gave negative responses with BF antigen.

Both of the above groups of sera gave negative reactions with corresponding types of antigens made from epidemic and murine typhus Rickettsiae.

Tests of sera from persons who had recovered from BF and RMSF made in the same way with washed antigens gave the following results: (a) Five persons whose previous attacks of BF dated from the number of years previously that are shown in brackets reacted respectively with BF antigen 1-320 (1 year), 1-40 (2 years), 1-40 (3 years), 1-80 (6 years) and 1-20 (10 years). The corresponding titres of these sera with RMSF antigen were 1-20, 0, 0, 1-10 and 0.

(b) Ten persons tested 14 to 217 days after the onset of RMSF reacted with the homologous antigen at titres of 1-80 to 1-1280 with BF antigen four of them were completely negative the titres in the other six cases were 1-10 to 1-160 and in each individual case the titre was considerably lower than with RMSF antigen.

The washed purified antigen can therefore be used to differentiate between boutonneuse fever and Rocky Mountain spotted fever although there is some degree of cross fixation which shows that the two diseases are antigenetically related to each other.

It is stated that other members of the spotted fever group are being studied in the same way.

John W. D. McLean

MAGALHÃES O. Rickettsiosis no Brasil [Rickettsial Diseases in Brazil]
Bol. Oficina Sanitaria Panamericana 1944 Jan v 23 No 1
 17-19 English summary

This article covers a summary of papers published in various Brazilian journals and also information furnished to the Pan American Typhus Committee. Most of the information is for the State of Minas Gerais, Brazil. Apparently Rocky Mountain spotted fever has existed in Brazil for quite some time. Various localities in the States of Minas Gerais, São Paulo and Rio de Janeiro are affected and the author believes that the disease may also be found in the States of Goiás, Espírito Santo and Bahia. There are four clinical forms of the disease: inapparent, mild, malignant and fulminating. It seems that there is only one virus but it is probable that there are various strains which may be differentiated by proper tests. The epidemiological nature of the infection in some regions of Minas Gerais is quite different from that of Rocky Mountain spotted fever in the United States. The principal field and mountain vectors are *Amblyomma cajennense* and *A. brasiliense*. The common bed bug (*C. lectularius*) was found in some cases infected in nature. From 1929 to 1942 the States of Rio de Janeiro, Minas Gerais and São Paulo have reported many serious cases as shown in the accompanying table.

The presence of epidemic exanthematic typhus was first suspected in Brazil by Lemos Monteiro and Fonseca Prado in 1932. In 1941 Sales Gomes reported four probable cases of murine typhus in the Capital of the State of São Paulo.

Year	States			
	Rio de Janeiro	Minas Gerais	São Paulo	
			Capital	Interior
1929		7	15	
1930			21	4
1931		2	28	9
1932		4	15	4
1933		20	26	3
1934		22	20	6
1935		23	22	7
1936		34	12	2
1937		27	11	2
1938		22	16	6
1939		15	25	14
1940	1	18	31	28
1941	20	24	19	43
1942	9	9	15	2

BUTAMANTE M E & VARELA G. Aislamiento de una cepa de fiebre manchada idéntica a la de las Montañas Rocosas en Sinaloa M V Isolations in Sinaloa of a Strain of Spotted Fever Rickettsiae Identical with that of Rocky Mountain Fever] *Bol Oficina Sanitaria Panamericana* 1944 Feb 1 23 No 2 117-18 English Summary

A complete account of this work was reviewed in this *Bulletin* 1944 1 41 p 394

DENGUE

CARSON D A. Observations on Dengue *U.S. Nat. Med. Bull.* 1944 May 1 42 No 5 1081-4

These observations relate to an epidemic of dengue in an island in the South Pacific area.

The author suggests that in addition to the known vectors *Aedes aegypti* and *Aedes albopictus* another species of mosquito may be concerned in transmission: *Aedes albopictus* var. *ferriarum* which breeds in holes in tree trunks and therefore needs special methods of control.

Infection in the area was spread from island to island chiefly by aviation personnel and control was at first inadequate because of failure to recognize the fact that *Aedes* mosquitoes bite by day as well as by night and because of laxity in applying mosquito-control measures.

Some of the usual clinical features were —

Pain referred to the eyes and aggravated by movement of the eyeballs was the most characteristic symptom. Break bone pains and initial chills were seldom observed. A saddle-back type of fever curve occurred in 77 per cent of the cases. The author applies this term to all the cases in which there was an obvious tendency to a two-phase type of curve. A third febrile peak was seldom seen when it did occur it was considerably lower than the preceding ones. The temperature usually became normal by the 6th day. Enlargement of the lymph glands, especially those of the cervical region occurred in 34 per cent of the cases. Pronounced leucopenia was observed in all the severe cases but in mild attacks the white-cell count was sometimes normal.

There was a maculo-papular rash on the trunk and extremities in 42 per cent of the cases; this made its appearance at an average of the fever after the first day.

The patients became fit for duty by the 10th to the 14th day.

The use of the therapeutic test by quinine or atabrine (mepacrine) is contraindicated till every other diagnostic measure has been tried.

John W. D. McArthur

PUBLIC HEALTH REP. Wash. 1943 Dec 10 1 35 No 30 1823-5
Dengue Fever in Honolulu

In Honolulu dengue broke out in July 1943 and by December 4th a total of 1250 cases had been reported the peak of the outbreak having occurred in October. There was great variation in severity.

from very mild ambulatory to extremely severe bedridden cases with delirium and mental disturbances one death is reported Previous outbreaks were recorded in 1903 and 1912 and 10 years ago there occurred in the natives a similar fever then not diagnosed as dengue

Charles W. Ilcocks

USINGER R. L. Entomological Phases of the Recent Dengue Epidemic in Honolulu *Pub Health Rep Wash* 1944 Mar 31 v 59 No 13 423-30 [12 refs]

Some of the interesting points contained in this paper are as follows —

There were no mosquitoes in Hawaii till 1826 when *Culex quinquefasciatus* [*C. fatigans*] arrived in a ship from Mexico *Aedes aegypti* and *Aedes albopictus* were introduced somewhat later No other mosquitoes have been found so that the islands like all the other oceanic islands of Polynesia and Micronesia except the New Hebrides are still free from indigenous malaria

The introduction of anophelines into the New Hebrides fully justifies the efforts made to exclude the entry of mosquitoes into Hawaii The spraying of all incoming planes is strictly carried out

Dengue was first introduced into Honolulu in 1902 from Hong Kong by a steamship which arrived with 12 cases of the disease on board the ship had sailed from Hong Kong 25 days earlier About 50 000 cases occurred in the islands

In October 1911 a steamship arrived from Mexico with cases of yellow fever among the personnel and a local watchman who went on board was attacked Prompt and drastic preventive measures were taken including the eradication of banana plants to the value of \$50 000 and no further cases occurred

In 1912 a second epidemic of dengue occurred in Honolulu and a few cases were reported in the three succeeding years

In July 1943 the disease again made its appearance it was probably introduced by the personnel of a commercial aeroplane In spite of preventive measures or more probably because of negligence by a large laundry establishment in carrying them out the infection became widespread in Honolulu and at one time 100 cases were being reported weekly

The distribution characters and habits of the three indigenous mosquitoes are described and it is mentioned that *Aedes scutellaris* and *Aedes albopictus* have been included by some observers under the name *Aedes aegypti*

At present 85 per cent of the *Aedes* mosquitoes of Honolulu are *albopictus* and only 15 per cent are *aegypti* Their habits are similar in most respects both are urban breeders and bite by day and not at night but *albopictus* breeds also in water in tree holes and at the bases of plant leaves so that its control in forest areas is impracticable It breeds also at higher levels—up to 2 000 feet—than *aegypti*

Aedes control in Hawaii comprises routine inspection and attention to all premises every ten days when epidemics occur adult mosquitoes are sprayed so are the inside and outside of all premises in and round foci of infection

Foliage is sprayed with a pyrethrum and oil spray three parts in 100 of water with Vatsol as an emulsifier

The breeding index in Honolulu in September 1943 was 83 per cent in a district with high rainfall and less than 4 per cent in a dry area

[October 1941]

but curiously the cases of dengue were far more numerous in the dry area. The high density of population in the latter locality favored transmission by mosquitoes with a short flight range and the dilution factor in mosquito bites when people are few and mosquitoes are present by the thousands was regarded as being a hindrance to transmission in the thinly populated area where the index was high. Successful control is anticipated through prompt reporting of new cases, the isolation of patients and spraying of local foci. The alternative is the painful and costly process of allowing a temporary immunity to develop as the result of unrestricted spread of the disease.

John B. M. M. M.

YELLOW FEVER

BRASIL - AFRIQUE FRANÇAISE LIBRE RAPPORT SUR LE TRAVAIL
 JONNEMENT TECHNIQUE DE L'INSTITUT PASTEUR EN 1940 (CEC
 CALDI J. Director 43-8 Fièvre jaune (Yellow Fever)

Serum protection tests have been continued during the year 7 out of 49 natives gave a positive reaction. The sera of a few animals were also tested. 3 horses, 2 cows, a goat, 2 gorillas and one agile manabai gave negative results while a chimpanzee showed a titre of 640 mouse units. This is thought to be due to non specific virucidal substances in the serum.

During the year 429 persons were vaccinated against yellow fever with vaccine supplied in 1941 by the Rockefeller Foundation. 301 were Europeans and 128 natives. Reactions were observed.

Protection tests were made of the sera of 28 persons who had been vaccinated in 1941. Blood was taken in 24 of them 20-23 days after vaccination in the remainder 14 after 7 to 14 months. Most of the sera were kept at 6°C in the refrigerator for about one year before being tested. Five suspension of virus corresponding to 64, 640, 1,280, 1,640 and 18,400 mouse protective units per cc respectively were used for each serum. The 24 men whose sera were taken 50 to 53 days after vaccination were officers and 18 to 23 years and apparently in good health. The detail are shown in a table. Two sera had a titre of 18,400 as the minimum for protection only 16 of the 24 could be regarded as immune. Of the other 14 persons tested after longer periods one (after 9 months) had a titre of 18,400 and in six others it was 640, only 7 were immune.

Four of the vaccinated persons were tested twice, first after 20 to 53 days and again after a further interval of about one year. In one the titre fell from 18,400 to 640 in another from 1,280 to 640 in the third from 640 to 64 while in the fourth it was 640 in both tests.

The vaccine was a tissue culture vaccine dried, 100 and was sent in ampoules each containing 100 doses. The batches were numbered 129, 130, 131, 132, 133, 134, 135 and 209 of these numbers 129, 130 and 131 were used to vaccinate the 38 persons whose sera were tested afterwards. The emulsion was made by dissolving the contents of one ampoule in 20 cc of 0.9 per cent sodium chloride solution (previously sterilized and kept in the refrigerator till wanted). From

the moment of preparation to the end of each vaccination sitting which did not exceed 20 minutes the emulsion was surrounded by crushed ice. Each person received 0.5 cc subcutaneously. The vitality of the batches of vaccine was tested by inoculating white mice at the end of 1943 after 22 months storage at about 6 C in the refrigerator it was found to be still active (nettement conservee)

J F Corson

(For the remainder of this Report see below p 873)

PLAGUE

JAWETZ E & MEYER A F Experimental Infection of the Chick Embryo with Virulent and Avirulent *Pasteurella pestis* Amer J Path 1944 May 1 20 No 3 457-69 9 figs on 1 pl [10 refs]

Avirulent living plague organisms are now in use as prophylactic vaccines on a fairly large scale. This has stimulated enquiry into the cause and mode of development of loss of virulence. It is to be noted however that loss of virulence is to some extent selective for the species of test animal used. Possession of an envelope has apparently been ruled out as the cause of difference between virulent and avirulent plague organisms and investigation into the antigenic constitution of the two types has not solved the problem. Serological tests fail to establish any fundamental difference between virulent and avirulent plague. Finally it would seem that the most striking characteristic of virulent organisms is their inability to proliferate freely even in susceptible experimental animals. The susceptible test animal used in the present work was the chick, not the hatched chick however which is evidently highly resistant to both intoxication and infection with *Pasteurella pestis* but the embryo chick of 12 to 14 days incubation. The method of procedure was to inoculate definite doses of virulent or avirulent organisms on to the chorioallantoic membrane, note the lethal effect, the distribution of the organisms in the body of the chick embryo and examine the membrane and organs histologically. Some of the main conclusions of the authors are that —

1 Chick embryos of 12 to 14 days are very highly susceptible to infection with *P. pestis* and are killed in 4 to 8 days by a dose of 20 virulent or 200 000 avirulent organisms.

2 Avirulent organisms if the dose is small and not lethal persist even for 3 to 4 days after hatching but in spite of their distribution by the blood stream exhibit this distinguishing feature they fail to multiply freely in the organs and are thus sharply distinguished from virulent organisms.

3 The difference in susceptibility exhibited by 12 to 14-day chick embryos is attributed to absence of a cellular defence mechanism the failure of hyperimmune antiserum to protect is taken to indicate that a cellular defence mechanism must be present for antiserum to exert its protective action.

W F Harey

WATSON, E. & McMAHON, Margaret C. Plague Sulfadiazine Treatment of Guinea-pigs Infected by Artificial Methods or by Flea Transmission. *Pub Health Rep* Wash 1944 Mar 24: 59
No 12 385-401 6 figs [13 refs]

These guinea-pig experiments were designed to reproduce the type and conditions of the disease in man. Sulphadiazine is excreted more slowly than other sulphonamides and was the drug selected. Twenty six animals were used for treatment as against 24 comparable untreated control and the treatment was begun after a papule had developed at the site of inoculation of flea bite with a rise of temperature to 39 C and an unmistakable bubo had developed in one or two contiguous lymph nodes. A satisfactory blood concentration of the drug was attained by an initial dose of 100 m^m sodium sulphadiazine subcutaneously and 100 m^m orally. This was followed by 100 m^m capsules by mouth for as long as seemed necessary in the test animal. Figures 1 to 3 give the results graphically of the animal inoculated intracutaneously with 1 000 to 25 000 *P. pestis* and figures 4 to 6 the results for guinea-pigs bitten by infected fleas. Thirteen of the 15 intracutaneously infected guinea-pigs recovered after treatment one died accidentally and one with sulphonamide crystals in the kidney. Eleven of the flea infected guinea-pigs developed the disease and even recovered after treatment showing no infection at necropsy 21 days after inoculation. Practically all the controls died. Sulphadiazine may therefore be of great value in the therapy of bubonic plague in man previous to the development of a generalized bacteremia.

W. F. Harvey

CHOLERA

GALLUT, J. & BRUMPT, L. C. Application expérimentale de l'hémocoagulation rapide du vibron cholérique [Experimental Rapid Agglutination of the Cholera Vibrio]. *Ann Inst Pasteur* 1944 Jan-Feb: 10 No 1-2 67-4

Haemocoagulation differs from the ordinary serum agglutination because the whole blood is used in test, the antigen organism are previously killed and stained. A reaction is obtained that can be read macroscopically in four minutes at room temperature. Suspensions in saline solution are prepared from the Inaba S type vibrio are kept for 48 hours at room temperature and shaken two or three times a day. The suspensions are then centrifuged at high speed and the deposit suspended in 10 per cent sodium citrate. It is suitably diluted, receives 1 drop of 1 per cent methylene blue per cubic centimetre and is filtered through cotton wool to give a homogeneous suspension. Rabbits were used as experimental animals and immunized sometimes subcutaneously, sometimes intravenously, either with OH antigen (vaccine heated at 56 C) or exclusively with O antigen (either vibrios heated two hours at 100 C or glucolipidic antigen) given in two doses at five days interval. The animals were kept under observation for three months and then tested by intravenous injection of three lethal doses of living vibrios. It was found that O and OH haemocoagulation occurred in a few minutes at room temperature while controls were

entirely negative. Intravenous immunization is much superior to subcutaneous. A noteworthy feature of the experimentation was the rapidity of occurrence, intensity and persistence of the agglutinins with glucolipidic antigen. This antigen gives toxic reaction intravenously in human beings and does not give positive haemagglutination subcutaneously for either O or OH antigen but should be tried as a diagnostic method.

W F Harley

HUANG J Treatment of Asiatic Cholera with Sulfaguanidine. Clinical Study of Twenty Two Cases. *J Amer Med Ass* 1944 May 6 v 125 No 1 23-4

As a result of this treatment of cholera by sulphaguanidine the author became convinced that an effective remedy has been found whereby the bitter enemy cholera can be subdued. This conviction is expressed in the concluding sentence. I fancy that the combined application of sulfaguanidine and salt solution injection will reduce the mortality to less than 5 per cent. In the discussion of his subject he takes fully into account the small number of his cases and the mortality of cholera under other methods of treatment. Improvement in these typical cases of cholera seems to have been dramatic. Of the 22 patients 21 were cured in a short time and 1 died within seventy three hours of being ill.

The following account may be taken as example of the mode of treatment. In 19 adults 3 gm was given as a first dose and 1 gm every two hours for six times then 1 gm every four hours for one to two days. The patients were ordered to drink as much water as possible and circulatory stimulants such as camphor water and tincture of digitalis were repeatedly given either by subcutaneous injection or by mouth. But no other drugs were given during the whole treatment.

W F Harley

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

BELTRÁN E El problema de la amibiasis en la Republica Mexicana [Amoebiasis in Mexico] *Rev Med Trop y Parasit* Habana 1944 Mar-Apr v 10 No 2 40-41 1 fig [11 refs]

This paper presents the incidence of *Endamoeba histolytica* in Mexico and discusses the relative value of the different reports used. Taking those worth considering and applying to them Andrews' correction factor when necessary, the frequency of *E. histolytica* is as follows: (a) Mexico City children attending at day time school in good sanitary conditions 7 per cent; (b) boarding school children living in defective sanitary surroundings 47 per cent; (c) Cuautla Mor 41 per cent; (d) Fresnillo Zac 17 per cent; (e) Tetelcingo Mor 52 per cent; (f) Chamilpa Mor 40 per cent; (g) Tepoztlan Mor 29 per cent; (h) Tehuantepec Oax 45 per cent; (i) Huixtla Chis 25 per cent; and (j) Estado de Yucatan 40 per cent.

DRUCKMANN A & SCHORR S Amebiasis and its Roentgenological
Manifestations Harefiah Jerusalem 1944 May 15 v 26 No 10
[In Hebrew 183-5 5 fi (16 refs) English summary 185-6]

X ray studies are very helpful to the clinician in establishing the
diagnosis of amebiasis of the colon liver and lungs

Amebiasis of the Colon

a The local ed type Here X ray examination particularly if
the barium enema is used yield characteristic roentgenological
findings The amebic granuloma to ether with the tissue reaction
elementa and sell n of the bowel all may cause a partial obstruction
such a is found in the case of carcinoma of the colon

Distinction between stenosis due to a malignant tumour or amebic
granuloma is based upon the following points

1 The amebic stenosis is usually longer than the stenosis due to
carcinoma

In amebiasis several areas of stenosis may be present simul-
taneously in carcinoma this occurs very rarely

3 In amebiasis the narrowing of the lumen is usually not so
complete as in the case of malignant stenosis

4 In amebiasis the transition from the pathological to the normal
portions in the majority of cases occurs gradually while in carcinoma
this transition is abrupt

b In amebiasis of the colon the mucous relief is to a lesser degree
changed than in carcinoma of the colon

b The diffuse type presents no characteristic X ray appearance
and it is rather difficult to separate it from idiopathic or ulcerative
colitis The X ray shows area of constriction lack of normal haustra-
tion irregular narrowing of the lumen with an unusual degree of
incompetence of the ileocecal valve

Amebiasis of the Liver and Pulmonary Involvement

When dealing with lung pathology (pleurisy, empyema, basal
pneumonia, abscess of the lung) the possibility of pulmonary amebiasis
should always be borne in mind particularly in countries with endemic
occurrence of amebiasis including Palestine too Among the complica-
tions outside the intestinal tract amebic hepatitis with pulmonary
involvement is by far the most common

In various stages of the disease the X ray appearance is character-
istic and in an untreated case the development of the various stages
may easily be followed up *First stage* amebic hepatitis without
involvement of lung The roentgenological symptoms consist in
elevation of the right diaphragm due to swelling of the liver restriction
of motion of the right diaphragm *Second stage* diaphragmatic
pleur The right diaphragm is hazy with clouding of the right
costo-diaphragmatic sinus *Third stage* penetration into the lower
part of the right lung—clouding of the base of the right lung sometimes
showing band shaped shadows *Fourth stage* the pulmonary patches of
infiltration are confluent creating an X ray appearance similar to that
of pneumonia of the lower right lung field *Fifth stage* amebic
pulmonary abscess—a stage which is occasionally reached presentin
on X ray examination a cavity with a fluid level

In each of these stages specific anti amebic treatment may restore
normal conditions

Abscess of the Liver

Here we find characteristic changes of the contours of the diaphragm—distinct bulging of the diaphragm pointing upward into the lower lung field. The diaphragm is elevated and immobilized.

PIRZADA M A Amoebiasis with special reference to Common Secondary Manifestations in the Punjab *Indian Med Ga* 1944 Feb v 79 No 2 61-6

Employing the now familiar arguments for and against the universal pathogenicity of *Entamoeba histolytica* the author here presents a detailed account of seven cases of secondary amoebiasis with problems of diagnostic importance.

The classical type of amoebic hepatitis with enlarged liver is not difficult to recognize but latent and subclinical hepatitis with pleural and pulmonary lesions are readily missed. Of these hepato-pulmonary amoebiasis in which inflammation spreads directly from liver to lung tissue constitutes the commonest type of lung lesion.

Fever was present in all either remittent or irregularly intermittent in type. Rigors were not recorded but marked upward or downward liver enlargement was noted in two. Pain in the right hypochondrium in three. Tenderness on liver pressure was the most constant sign but shoulder pain was absent.

On the other hand intestinal signs and symptoms were insignificant although a history of diarrhoea or dysentery was obtained. Thickening of the colon could be elicited in two though caecal tenderness was more constant. Faecal examinations were distinctly disappointing and *E histolytica* cysts were demonstrated only in one—a fact which invokes comment from the clinical aspect. Typical chocolate coloured pus was recovered from the pleura in two cases. In the three lung abscesses sputum was mucopurulent with varying quantities of blood. No *E histolytica* were found in the pleural exudate or in pulmonary discharges. A moderate leucocytosis (11 000-20 000 per cmm) was present in all except one pleural effusion complicating amoebic hepatitis. In one case only (of empyema) were the polymorphs above 80 per cent. Eosinophilia was not present in any case. *P Manson Bahr*

DEL SEL M Hepatitis amibiana en sus formas atípicas [Clinically Atypical Forms of Amoebic Hepatitis] *Rev Asoc Med Argentina* 1944 Apr 30 v 58 No 532 217-19

As a warning to medical practitioners to be on the alert for unusual manifestations of hepatic amoebiasis the author relates the histories of five patients in whose cases the symptoms were unusual and diagnosis uncertain but who rapidly recovered when suspicion of amoebiasis arose and emetine was given.

The first was a man of 23 years. He had so he said never had any intestinal upset but for a week had felt pain in the lower part of the right side of the chest with marked fever of a remittent type severe headache and some vomiting. The spleen was not palpable but on percussion was found to be enlarged. Typhoid or paratyphoid fever was suspected but the Widal test was negative the leucocytes numbered 25 000 per cmm and rash did not appear. Emetine was given and the

first dose was followed by a further rise in temperature though the patient felt generally better. The drug was persisted with and recovery was rapid.

The second patient was a lad of 17 years whose history was that he had had much abdominal pain after having eaten a large quantity of figs. Diagnoses varied for a few days between retrocaecal appendicitis and perinephric abscess. Purgatives did not benefit. The liver was a little enlarged and emetine was given with excellent results.

The third was a man of 65 years who suffered from constipation said he had never had diarrhoea but had suffered for a month from pain in the right hypochondrium and flank with bilious vomiting, weakness, an intermittent fever and weakness with loss of appetite. The liver was a little enlarged. Cholecystitis and biliary cirrhosis were the diagnoses. *Escherichia coli* was seen in the faeces but neither *Escherichia coli* or its cysts. Nevertheless emetine was given with good effect in the preceding cases.

The fourth was a man of 39 years thin pale with a pulse 110 generally debilitated with praecordial pain and a friction sound there. The liver enlarged to three finger breadths below the costal margin with considerable pain. Diagnosis of enlarged liver from back pressure due to failing heart secondary to pericarditis was made. After a large dose of sodium salicylate 8 gm in the day the signs of pericarditis disappeared. Hydatid cyst was then suspected or commencing liver abscess and emetine was given. The symptoms cleared up.

The last case was in a man of 60 years complaining of pain in the right hypochondrium not marked. In fact he thought little of it. He had no vomiting, no diarrhoea, dyspnoea or cough. He was kept in hospital because he had rise of temperature and pleurisy with effusion was suspected and a little yellow fluid was drawn off. He then felt some pain over the liver and there was slight oedema of the chest wall. The pulse rate was 150 per minute. Blood examination gave red cells 3,500,000 white 11,000 per cmm with slight relative polynucleosis. Diagnosis of some subdiaphragmatic condition was made with subjacent pleural reaction. Emetine was given in doses of 6 cmm daily subcutaneously. The temperature fell to normal the pleural signs rapidly disappeared and progress to health was uneventful.

H. H. Aldrich

KATZALFE, C. P., McCOORD, AURITA, B. & PHILLIPS, W. A. Vitamin A Absorption Test in Cases of Giardiasis. *American Journal of Tropical Medicine* 1944 Mar. v. 67 No. 3 199-203 6 charts.

VEGHELYI [this Bulletin 1940 v. 37 375] and others have described the varied and vague clinical symptoms associated with the presence of *Giardia lamblia* in the upper part of the small intestine of children. In addition Veghelyi has concluded that because of the increased amounts of fat and lipase in the stool of such children the flagellates had impaired the absorption of fat from the intestine. The fact that after eradication of the infection by means of quinacrine [m. paricine] hydrochloride the stools became normal appeared to indicate that removal of the parasite had restored the normal power of the intestinal mucosa to absorb lipids. With a view to throwing further light on the question the authors of the paper under review applied the vitamin A absorption test of KATZALFE and McCOORD [see Bulletin of Hygiene 1936 v. 11 264] to a number of cases before and after

treatment In all of 15 cases absorption of vitamin A after administration by mouth of 7 000 U S P units of vitamin A in fish liver oil per kilogram of body weight was less than in normal children in whom the blood concentration increases to a maximum of 225 units four hours after the dose has been taken Thereafter there is a gradual fall to the basal level during 20 hours In infected children the concentration at the end of four hours varied from 8 to 139 units After treatment in nearly all cases there was improved absorption and in some it was even better than normal In one case the absorption remained poor and this proved to be a case which suffered relapse As a control three cases with symptoms of coeliac disease in which vitamin A absorption is also defective administration of a course of quinaquine hydrochloride failed to produce any improvement It is concluded that these results afford further evidence of the pathogenicity of *Giardia intestinalis*

C M Wenyon

RELAPSING FEVER

ORDMAN D Epidemiological Observations on an Outbreak of Tick Relapsing Fever in the Northern Transvaal *South African Med J* 1943 June 12 v 17 No 11 180-82

The present study was carried out in December 1941 on the occurrence of relapsing fever in a community of about 2 000 native labourers employed on a large agricultural estate in the Potgietersrust district of Northern Transvaal

The natives were housed in a number of compounds each comprising 100-200 persons who lived in round huts built in native style Most of the huts were found to be infested with *Ornithodoros moubata* and in some cases these were present in considerable numbers and ticks could easily be collected from the sandy floors and cracks and holes in the walls This community during 1940 and 1941 showed an average daily sick rate ranging from 2 to 3 per 100 daily population to between 4 and 5 per 100 in 1941 During the period July to December 1941 600 blood smears had been examined and relapsing fever spirochaetes found in 158 (26.3 per cent) indicating an incidence rate of about 20 per 1 000 per month during this period For various reasons this figure must be regarded as an underestimate for patients without fever escaped blood examination smears were taken only of hospital patients and the smears were not always taken at the most appropriate time for finding spirochaetes in the blood

The distribution of cases in native groups shows that Africans from regions where the disease is endemic are less susceptible to infection than those exposed for the first time [see also this *Bulletin* 1942 v 39 343] No deaths from relapsing fever were recorded in this community and the death rate from all diseases was only 1.32 per 1 000 per month

As a result of his investigation the author made the following recommendations —

All natives reporting sick should be sent to hospital for medical examination Where the clinical diagnosis is not obvious their blood

should be examined for spirochaetes at the height of the fever. Injection of an arsenical compound should be given to all patients suffering from relapsing fever during the height of the temperature.

In addition attention should be paid to the housing of African employees and it is advised that all new huts should be rendered tick proof by being built on a concrete or other solid base forming a hard smooth crack free floor some two or three inches above the ground. The interior walls should have a smooth surface and be rounded off at the top where they meet the grass thatching and also at their junction with the floors.

E Hindle

HAWKING F. The Action of Sulphonamides against *Treponema*
re " Brit J Exper Path 1944 Apr 25 No 2
63-

An investigation of the prophylactic action of sulphapyridine and other sulphonamide compounds in suppressing infection of mice due to *Spirochaeta cecilliae*.

When infected mice were fed on a wet mash diet containing 15 per cent sulphapyridine the spirochaetal infection was either completely suppressed or its intensity much diminished. A similar activity was also shown by sulphathiazole but not by other sulphonamides including sulphanilamide, sulphadiazine, sulphamezathine, sulphacetamide, sulphaguanidine, argamid, prontosil rubrum and diamminodiphenyl sulphone.

It would seem that the anti-spirochaetal action depends on the presence of a pyridine or thiazole ring rather than upon the sulphonamide groups but attempts to produce it with acetyl sulphapyridine, pyridine 3-sulphonamide or amino-pyridine sulphate were unsuccessful.

The anti-spirochaetal action is not antagonized by *p*-aminobenzoic acid nor by nitrofurantoin.

Experiments with *T. parva*, *T. lewisi* and *T. evansi* using this technique failed to reveal any antitrepanosomal activity of sulphapyridine and other sulphonamides. See also ISHII *et al* this Bulletin 1942 v 39 196. FELDT *ibid* 344. VARGAS & ZOZAYA *ibid* 603.
E Hindle

YAWS

ITURBE J. Comunidad del ori en americano de las bubas y la s filis
Discurso de orden America the Common Source of Yaws and
Syphilis Rev Sa idad y Asist ca Socl Caracas 1943
Oct 8 No 5 190-106 34 ref

The author chose this subject for his address at the closing session of a Venezuelan Congress of Dermatology and Venereology. It consists almost entirely of recordings from the literature on the time-honoured question of the identity or non-identity of yaws and syphilis, whether the latter was brought to Europe by Columbus on his return from America. He speaks of the absence of signs of syphilis in the bodies of Europeans prior to this return and the presence of bony lesions of the disease in the natives of America before Columbus.

arrival. He quotes also the experimental work of JAHNEL and LANGE [this *Bulletin* 1926 v 23 18 1927 v 24 304] who tried to inoculate yaws into a general paralytic without success. He does not adduce any evidence of work of his own on this subject and leaves us in doubt as before. The reviewer has

heard great argument
About it and about but evermore
Came out by the same door as in I went

H Harold Scott

LYONS H A Yaws Report of a Case appearing in a White Man
U S Am Med Bull 1944 May v 42 No 5 1168-9

A medical officer in the Solomon Islands who was treating cases of yaws there was bitten on the left fourth finger by what was thought a centipede. Acute lymphangitis with epitrochlear lymphadenitis followed and was treated with sulphadiazine. Seventeen days later a sloughing punched out ulcer appeared at the site of the bite and soon afterwards there was a maculo papular eruption on the trunk. It was reported that spirochaetes resembling *Treponema pertenue* had been seen by dark ground illumination on board a hospital ship and that the Kahn reaction at the same time had been strongly positive.

On admission to the base hospital there was a granulating area about 5 mm in diameter with moderate surrounding induration on the dorsum of the middle phalanx of the left fourth finger. The epitrochlear and axillary glands were enlarged and a few scattered maculo papular lesions were present on the trunk. An intramuscular injection of Iodobismutol 0.36 gm was given on the fourth day after admission and recovery was uneventful. [See also this *Bulletin* 1920 v 16 469 1921 v 18 251 1944 v 41 402]

J F Corson

LOVERA I Observaciones clinicas de buba [Clinical Observations on Yaws] *Rev Sanidad y Asistencia Social* Caracas 1943 Oct v 8 No 5 1073-92 4 figs on 2 pls

After some preliminary remarks on yaws in general the author analyses cases which have come under his observation or which he has studied from records. Among nearly 9 000 cases the primary lesion was on the dorsum of the foot in 21.7 per cent on the toes in 3.2 on the legs in 20.5 on the ankle in 6.3 and knee in 4.1 per cent. That is well over half were on the lower limb. The author analyses the tertiary lesions in 3 646 cases [not 3 678 as stated]. Of these 2 644 had patches of hyperkeratosis 489 had gummatous ulcers nearly all on the legs 201 showed chronic bursitis and small synovial cysts mostly about the wrists or knees 185 had framboesial rheumatism and synovitis 57 had callosities or horny growths 47 osteitis or periostitis gonorrhoea etc one had gangosa and 22 mutilating lesions of hand or foot.

H Harold Scott

DOMIGUEZ SISCO R Breve comunicaci6n sobre el resultado de la reaccion de Khan con sangre del cord6n umbilical de ni6os cuyas madres han padecido buba [Khan Reactions with Blood from the Umbilical Cords of Infants whose Mothers had had Yaws] *Rev Sanidad y Asistencia Social* Caracas 1943 Oct v 8 No 5 897-8

In 1939 the author drew attention to the frequency with which positive Kahn reactions were obtained with blood from the umbilical

cord and further study revealed that the mothers of these cord positive children had many of them suffered from yaws. The present article deals with 119 mothers who had suffered from yaws among 4500 confinements in the Maternity Department. Ten of these were syphilitic and are excluded from this study. Of the remainder 80 (8 per cent) gave positive Kahn reactions. Since yaws patients practically always give a positive Kahn it seemed that pregnancy had some effect in reversing this. Seventeen of the 109 were admitted to hospital for abortion or attempted abortion leaving 92 who gave birth to 93 infant. In 89 of them the cord blood was tested and only 31 (34.8 per cent) were Kahn positive. In 15 of the 92 the blood taken from the longitudinal sinus was tested later and it was found that 16 (106.7 per cent) were positive. The importance of this is obvious. If a child's blood be tested soon after birth a positive Kahn reaction (resulting from yaws in the mother) may lead to an erroneous diagnosis of congenital syphilis not only a stigma on the parents and child but perhaps the cause of prolonged and unnecessary treatment. Also since the proportion of mothers who had had yaws and now gave a positive Kahn reaction was small it would appear that pregnancy tends to be active the Kahn reaction which is positive in non pregnant women with yaws.

H. H. Old Scott

VEGAS M. LOVERA I. MIGUEL ITRIAGO P. & MEDINA P. La campana contra la buba en Venezuela [Yaws Campaign in Venezuela]. *Rev. Sa. del Asist. Social* Caracas 1943 Oct 18 No 5 1015-61 8 charts and 1 map

This campaign was begun in 1938. Commisars were appointed and the first stated work in the Yaws Department at Carabobo and Yaracay. In the two following years extension was made to include two other districts. The plan of campaign comprised first a census of the population of each district not always an easy matter because much of it is nomadic but the local authorities did all they could to help. Next came treatment of all patients with the disease in an active state and of those who showed old lesions of five or more years standing such as juxta-articular nodules, periostitis, gangrenous et. Till the end of 1941 a hypo-soluble form of bismuth was used but after that date an insoluble salt. Local application of an ointment composed of yellow oxide of mercury 20 gm. subcarbonate of iron 50 gm. balsam of Peru 100 gm. vaseline 1000 gm. was also prescribed. In subsequent years re-examination was carried out as a measure of control to note any new case or relapse of those previously treated. Specimens of the Forms of Return for record are reproduced in the article and many tables of figures for various districts and sub-districts. The authors would not interest the general reader. One example may be given to show the extent of prevalence. In Carabobo 3831 active cases (9.63 per cent according to the table) and 15392 (14.92 per cent) old cases a total of 9763 or 24.55 per cent were found. Altogether in 44 years work 256703 persons were examined. Among these there were 16484 active and 14890 old cases a total of 31374. Of these 20355 were cured 883 improved 1887 (mostly of the old cases group) refused treatment. Re-examination for control of results is not complete but in two communities (size and numbers not stated) at the first re-examination 19 cases of fresh infection were seen.

at the second 1 only at the third and fourth none at the fifth 5
 at the sixth 36 but it is stated 21 of these were from untreated
 zones [presumably immigrants] H Harold Scott

HELMINTHIASIS

RATCLIFFE H L A Method for preparing Permanent Slides of the
 Ova of Parasitic Worms *Science* 1944 May 12 394

Satisfactory permanent preparations of the ova of parasitic worms
 may be made by the following method —

1 Prepare a series of dilutions of gum chloral in 10 per cent
 formalin beginning with 10 per cent and increasing by steps of 2 per
 cent

2 Concentrate the suspension of faeces that has been thoroughly
 fixed in neutral formalin until each drop contains 10–12 ova

3 Pipette 5 cc of the concentrated suspension into each of a number
 of 15 cc bottles add an equal quantity of 10 per cent gum chloral
 formalin to form a layer below the suspension cap the bottles and
 stand until the faecal material has settled Pipette off the supernatant
 fluid and add an equal volume of the next stronger solution of gum
 chloral formalin Continue this until the ova are suspended in full
 strength medium After removal of excess fluid mount the last
 sediment under round cover glasses

The whole procedure takes months but except in the case of hook
 worm ova the eggs are nearly all free from distortion The method is
 also suitable for making preparations of adult hookworms and other
 small nematodes mites ticks lice larvae and pupae of flies [The
 following formula for gum chloral mounting medium for insects etc is
 given in *The Microtomeist's Vade Mecum* (Bolles Ltd) 10th Ed
 1937 p 599 —Distilled water 50 cc gum arabic 40 gm glycerin 20 cc
 chloral hydrate 50 gm Dissolve the gum in the water cold then add
 the chloral and dissolve with gentle heat then add the glycerin and
 filter through cambric in a hot funnel J F Corson

RUIZ RODRÍGUEZ J M La schistosomiasis Mansonii en Venezuela
 [Schistosomiasis Mansonii in Venezuela] *Rev Facul de Med Bogotá*
 1944 Jan v 12 No 7 361–6

DUGUID J B & SHEPPARD Edith M A Diphylobothrium Epidemic
 in Trout *J Path & Bact* 1944 Jan v 56 No 1 73–80
 17 figs on 5 pls

The authors investigated the cause of the deaths of practically
 100 per cent of freshwater trout in an open storage reservoir in South
 Wales in 1942 and found that they were due to general peritonitis
 caused by the plerocercoids of a tapeworm belonging to the Diphylo-
 lobothriidae The sticklebacks (*Gasterosteus aculeatus*) in the same
 reservoir were also affected In March 1943 the tapeworm was found
 in trout from a smaller reservoir separated from the first by only a
 narrow embankment but it was not found in fish from the supply
 reservoir 25 miles away nor in fish from other sources in the district

When the plerocercoids were given in the food to laboratory rats
 and to one dog they developed into adult worms which resembled

Diphyllobothrium latum but they did not multiply when they were implanted into the subcutaneous tissues and peritoneal cavities of rats but were encapsulated there.

The authors describe the life history to the procercoid stage in the Cyprinodontid *Gambusia affinis* and *Cyprinus carpio* but had not at the time of writing succeeded in infesting fish by feeding them with infested Copepod.

Identification of species of *Diphyllobothrium* is difficult because only one stage of the life histories of so many of them has so far been identified. The identity of the species found in these trout has not been fully established. The adult, the cercarium and the procercoid seemed to correspond with descriptions of those of *Diphyllobothrium cordi*.

Similar helminth infestations in trout in one of the Yellowstone Park Lakes. Similar infestations have occurred in Elk Lake, Oregon and in California. Some helminthologists regard *D. cojeceps* and *D. latum* as being identical others do not. Both the Welsh reservoirs in which the infested trout were found have been open to anglers for years. There was little evidence that birds (the gull) brought in the infestation. A small mammal seemed to be a more likely carrier. One Belgian soldier who was later found to be a carrier of *D. latum* had camped in the neighbourhood. In a footnote the authors say that from material sent to them from Dr. PETERSON of Yellowknife, that a species of *Diphyllobothrium* is endemic also among the fresh water trout in certain of the Shetland Islands.

The *Lancet* (1944 Apr 8-15) in an annotation points out that so far human infestation with *D. latum* has been reported in the British Isles only from the West of Ireland. O'FARRELL in *Bulletin* 1918, 12, 191. Though the identity with *D. latum* of the parasite described is not fully established there is a possibility that *D. latum* may have been brought into Britain by refugees from Norway or Poland. Its introduction to North America by immigrants has resulted in the establishment there of considerable endemic foci within recent years.

G. Lamb

HICKEY, W. D. & HARRIS, J. R. Definitive Hosts of a Species of *Diphyllobothrium* causing Mass Infection of Trout in Reservoirs. Preliminary Note. [Memoranda.] *Brit. Med. J.* 1944 Sept. 2, 310.

Referring to the report by DUGUID and SHEPPARD (above) the authors record that seagulls and cormorants from the Dublin area are infected with an adult tapeworm of the genus *Diphyllobothrium*. They think that these birds are the naturally infected definitive hosts of the tapeworm found in that district. Trout from reservoirs near Dublin are heavily infected with plerocercoids of the family *Diphyllobothridae*. All stages of development of the tapeworm from the plerocercoid found in the fish to the adult stage were found in the intestines of greater and lesser black-backed gull (*Larus marinus* and *L. fuscus*) in herring gulls (*Larus argentatus*) and in cormorants (*Phalacrocorax urbeo*). Investigation of the infection at Poulaphuca reservoir near Dublin is proceeding and will be reported later. G. Lamb

TOTTERMAN, G. On the Price-Jones Curve in Tape-Worm Anemia. *Acta Med. Scand.* 1944, 117, No. 2, 135-44, 2 figs.

The results of the examination of the Price-Jones curve in 15 cases of tape worm anemia were as follows:

1 There was no correlation between the size of the mean diameter and the size of the standard deviation

2 Neither could a correlation between the size of the mean diameter and the red cell count be stated

3 On the other hand there was a close agreement between the red cell count and the size of the standard deviation as the standard deviation was largest in the cases where the red cell counts were the lowest

4 These results agree exactly with the results that Mogensen and Price Jones obtained in cryptogenetic pernicious anemia

5 In 4 cases of tape worm anemia the curves were clearly asymmetrical and could be divided into one left and one main component as in cryptogenetic pernicious anemia (Mogensen) In 3 further cases which have fairly symmetrical distribution curves there is reason to believe that behind the abnormally great deviation is hidden not only a left component but a right component as well The remaining eight curves are practically symmetrical but the increased mean diameter and standard deviation cause them to differ from the normal curve

6 The distribution curve in severe tape worm anemia shows traits which are characteristic of cryptogenetic pernicious anemia

[Though it is not very clear this work was presumably done in connexion with infection by *Diphyllobothrium latum*]

FOLEY E J Multiple Unilocular Hydatid Cysts *East African Med J*
1944 May v 21 No 5 152-3

A native woman from the Singida District was admitted to Dodoma Hospital Tanganyika Territory with an enormous enlargement of the abdomen which had been developing for the previous five years There were two large cystic swellings each about the size of a football situated near the liver and in hypogastrium respectively a large swelling in each loin and three or four movable swellings about the size of a fist were also present Laparotomy was performed on October 14th 1943 two days after admission The swellings were hydatid cysts the two largest were incorporated in the liver and uterus respectively the loin cysts were attached to the kidneys and the smaller cysts were in the omentum and mesentery There was a large retroperitoneal swelling between the two kidney cysts and in addition there were hundreds of cysts varying in size from that of an orange to that of a pea scattered over the peritoneum

The cysts of the liver and uterus were emptied and a few cc of 1 per cent formalin were injected into them One of the smaller cysts was dissected out and found to contain daughter and granddaughter cysts and hydatid sand The patient died on the following day and a post mortem examination was made The hooklets were those of *Echinococcus granulosus* The liver cyst was unilocular No cysts were found in lungs thorax or skull
J F Corson

BAUMANN H Eosinophile Pleuritis bei flüchtigem eosinophilem Lungeninfiltrat [Eosinophiles in Pleural Effusion with Transient Eosinophilic Pulmonary Infiltration] *Schweiz med Woch*
1944 Apr 1 v 74 No 13 326-8 2 figs [12 refs]

A recruit 21 years of age when in excellent health was suddenly seized with a violent fit of coughing and after it had some difficulty

in breathin but had no pain. There was no expectoration. Blood examination showed leucocytes 14 000 eosinophiles 25 per cent and two days later 20 000 and 33 per cent two days later still 21 000 and 47 per cent. He had slight fever to 39° C but this slowly fell to normal during the next ten days. He showed signs of pleural effusion and in this fluid and in the sputum now being excreted eosinophiles were numerous. In three weeks the man had regained his normal state of health. The author discusses Loeffler's syndrome [see this *Bulletin* 1944 v 41 474 where other references are given] but within three months of the onset of his symptoms he was passing ova of *Ascaris lumbricoides* and anthelmintic treatment resulted in the expulsion of adult worms. It is most probable that his attack was due to larvae of *Ascaris* in the pulmonary stage of their development. Before his illness he was accustomed to eat raw salad at least twice a week.

H. Harold Scott

BULL. U. S. ARMY MED. DEPT. 1944 May No 16 45-9 Early Filariasis in American Soldiers

In this special article reference is made to two papers not yet published in which WARTMAN and KING record observations on 268 cases of filariasis among American soldiers in the Pacific islands. In one island about one fifth of the soldiers showed symptoms that were attributed to filariasis. The earliest onset of symptoms occurred three months after arrival. The first symptoms were pain and swelling or redness of the arm (38 per cent) leg (14 per cent) or scrotum (56 per cent). The characteristic of symptoms were: enlarged lymphatic of a limb or of the trunk, swelling of lymphatic gland and acute inflammation of the scrotum, testis and spermatic cord accompanied at times by exquisite pain. Some degree of eosinophilia was observed in about two thirds of the patients but about a quarter of the men had intestinal worms also chiefly hookworm or whipworm. No microfilariae could be found in any of the patients though the search for them was thorough and in two patients adult female filariae were found in lymphatic tissue by biopsy.

The intradermal test described by TALIAFERRO and HOFFMAN [see this *Bulletin* 1931 v 28 214 and by FAIRLEY (*ibid.* p 679) was used as an aid to diagnosis: the reaction was positive in 90.8 per cent of 164 patients and in only 10.5 per cent of the control (persons who had never spent time in the tropics).

All except five of the 268 patients were returned to the United States.

It was conclusively shown that mapharsen [mapharside] and sulphathiazole were ineffective in the treatment of the cases.

Biopsies were made in 17 patients the tissue removed being 20 lymph glands and four cordlike structures from areas of acute lymphangitis. Adult male and female filariae were found in five. The female worms contained large numbers of eggs and microfilariae but no microfilariae were found free in the tissues. Examinations for the presence of bacteria in these tissues gave negative results. The lymphatic glands showed granulomatous inflammation. Wartman suggests that the absence of microfilariae in the blood may be due to the vascular nature of the granulomata, the hyperplasia of macrophages and the small number of worms found in the biopsies.

The histories prove that white persons can be infected during short visits to endemic areas and that signs and symptoms of filariasis may develop as early as three months after exposure to infected mosquitoes [The species of filaria is not mentioned in the paper but as the mosquito *Aedes variegatus* (*Aedes scutellaris pseudoscutellaris*) is referred to as the chief vector in the area of the Pacific islands it may be concluded that it was *Wuchereria bancrofti*]

J F Corson

BROCKLEBANK J A Calcification in the Guinea Worm Brit J Radiology 1944 May v 17 No 197 163-4 3 figs

Guinea worms in the subcutaneous tissues may become calcified after death and be revealed accidentally in radiographs This is shown in three illustrations in the present paper one shows a worm in front of the knee below the patella in another it is curled up in the foot and in the third the whole length of the worm is clearly shown in the leg resembling the appearance seen after injection with lipiodol In some cases a small part of the worm only is calcified and it is then liable to be confused with other calcified tissues

J F Corson

MINCKLER D Rapid Clearing of Pin Worms (*Enterobius vermicularis*) for Class Study Stain Technol Geneva NY 1944 Apr v 19 No 2 63-4 1 fig

The following method of making permanent microscopical preparations of *Enterobius vermicularis* gives sufficient detail for students class work

(1) Fix in 10 percent formalin (2) Wash for several hours in running water (3) Dioxan three changes one hour each (4) Carbol xylene (phenol 1 xylene 3) 24 hours (5) Neutral xylene 3 changes a few minutes each (6) Mount in dammar dissolved in xylene and cover

The various bottles can be inverted and drained as the worms stick to the glass for mounting they are picked up with a wide pipette

The nerve ring is not visible but the digestive and reproductive organs are shown

J F Corson

MOZZOTTI L & CHAVIRA C Investigación de triquina en 600 diafragmas humanos de la ciudad de Mexico [Trichinella in 600 Human Diaphragms in Mexico City] Rev Inst Salubridad y Enfermedades Trop Mexico 1943 Dec v 4 No 4 343-51 1 fig [16 refs] English summary

The examination of 600 diaphragms collected at autopsies performed in the city of Mexico showed that 30 of them (5 per cent) were infected with *Trichinella spiralis*

According to these results the incidence for trichinosis in Mexico appears to be lower than in other countries

DEFICIENCY DISEASES

STANLIS H S Some Problems in Riboflavin and Allied Deficiencies
Brit Med J 1944 July 22 & 29 103-5 140-44

The first part of these lectures is devoted to the discussion of a syndrome recognized many years ago and then later further defined and its relation to the condition to which the term ariboflavinosis was assigned by SEBRELL & BUTLER (1938) [*Pub Health Rep Wash* 53 228]. In the second part is put forward a tentative explanation of the pathogenesis of the signs and symptoms of riboflavin deficiency and of their peculiar localization based on an anatomico-physiological consideration of the capillary-vascular system.

Just as pneumonia was recognized as a clinical entity long before the discovery of the pneumococcus so too a clinical syndrome had been described many years before the proof by Sebrell & Butler that certain symptoms appeared in persons kept on a diet deficient in riboflavin which in turn disappeared when riboflavin was administered.

Attention was first called by the author in 1911 to these symptoms resulting from a dietetic deficiency in association with pellagra and also unassociated with that disease. At the same time he pointed out the resemblance of the symptom to those described by STRACHAN (1888) in what he called Malarial Multiple Neuritis in Jamaica and in 1930 reference was similarly made to the paper by SCOTT in the *Bulletin* 1919 13 37 on Central Neuritis in Jamaica of supposedly toxic origin.

In 1936 [this *Bulletin* 53 729-41 815-25 885-901] a number of observations on similar conditions by various authors in different parts of the world including those by Fitzgerald MOORE and LANDOR & PALLISTER were collected together and reviewed in an article entitled

Pellagra like Conditions — pellagra like because the individual symptom occur in pellagra as well as dissociated from that disease and not pellagrous as some subsequent writers have interpreted the expression.

The symptoms noted in all the observations together with others since published including those made during the Spanish Civil War and those cited by American authors under the term ariboflavinosis are given in the form of a table.

Thus presented they form a most interesting series which the author suggests demonstrates a single syndrome in more or less complete form the variation depending on the degree and duration of the nutritional disturbance.

Included in this syndrome are glossitis cheilosis angular stomatitis a similar condition about the free margins of the prepuce the eyelids nostrils vulva and anus a dermatitis of the scrotum and adjoining part of the thigh a milium erythema of the skin of the face and body with fine desquamation diminution of visual and auditory acuity certain other neurological symptoms referable to the central nervous system slight mental changes congestion of the conjunctiva and lumbic plexus together with corneal vascularization.

The author says Although there are reasons on epidemiological ground for believing that all the signs and symptoms I have grouped together should be considered as parts of a single clinical entity due to riboflavin deficiency we cannot at the present time exclude the possibility that some other factor—perhaps some other member of the vitamin B complex—plays part

He prefers to speak of a *hypo riboflavinosis* as death must occur long before a condition of a *riboflavinosis* is approached

The part played by riboflavin in carbohydrate metabolism as the link between the anaerobic dehydrogenase system and the aerobic cytochrome cytochrome oxidase oxygen system is mentioned shortly with a set of schematic equations which are useful in explaining the difficult problem of biological oxidation

The author then goes on to develop his main thesis. Perhaps we do not always realize that the vascular system has been developed for a single purpose—that of carrying to the immediate environment of each individual cell all the essentials to satisfy its needs thus creating an environment comparable to that of a unicellular organism. The actual living parts of complex organisms are embedded in a fluid matrix constituting an internal environment the constitution of which normally remains constant—a truth crystallized in Claude Bernard's expression—*La fixité du milieu intérieur est la condition de la vie libre*. It is pointed out how *great* is the part played by the capillary system how *many* its functions. The endothelium forming the capillaries constitutes a tissue of great activity—it must need a considerable amount of energy in order to carry on its functions yet nothing is known concerning the metabolism and respiration of its cells. I think the assumption is warranted that the endothelial cell respire in the same way as the cell of any other tissue and that for its metabolic processes it must be supplied with sugar oxygen and all those other elements essential for cell life—including riboflavin.

It is then suggested that in the event of a deficiency in any one of these elements—or in some one of the elements—namely riboflavin—the capillary endothelium will be one of the first if not the first of the tissues to suffer the effects of interference with normal respiration and metabolism. The result of this anoxia in the wide sense of the term upon the capillaries is a derangement of function which I shall refer to as *capillary dysergia* with the development of loss of tone dilatation and decreased flow. This in turn leads to a disturbance in the surrounding *milieu intérieur* and so to a metabolic disorder of the cells of the neighbouring tissue.

The second part of these lectures is devoted to showing how the signs and symptoms of *hyporiboflavinosis* may be explained on this idea of *capillary dysergia*.

The relative number of capillaries (*capillarity*) varies in different tissues being proportional to the metabolic needs of each. It is suggested that the manifestations of riboflavin deficiency will become apparent first in those tissues with high metabolic activity and a high degree of *capillarity*.

In turn the lesions of the skin lips tongue etc and the ocular manifestations are dealt with. The author believes that the vascularization of the cornea is a process quite apart from the congestive signs in the conjunctiva and limbus. Evidence is also adduced for believing that riboflavin reaches the cornea through the lachrymal secretions and the suggestion is made that the corneal vascularization in vitamin A deficiency is in fact due to a local riboflavin deficiency.

The loss of visual acuity which American writers have ascribed to changes in the ocular media the author believes to be due to a capillary lesion in the central nervous system so too the diminution of auditory acuity.

The section dealing with the neurological symptoms which the author has admitted to the syndrome though speculative is one of the most interesting and stimulating.

The distribution of the initial disorder in the central nervous system is determined by the relative capillarity in different areas and different elements of nervous tissue. In this syndrome it is the capillaries supplying the neurophyl or mass of protoplasmic strands contributed by dendrites terminal axon arborizations and other synaptic structures of the cerebellum which are first affected. The condition is one the author suggests that precedes that described by Adolf Meyer as central neuritis. Upon this basis an explanation is offered for what has been described as the lack of systematization of the neuropathological lesions in pellagra and allied conditions.

H S Stannus

References are not given in the original paper which is the abridged version of the Lumsden Lectures delivered before the Royal College of Physicians of London on April 18th and 27th 1944 but in the author's reprints there is included a bibliography of some 167 references.—Ed

SANDSTEAD H R. *Deficiency Stomatitis*. *Pub Health Rep* Wash 1943 Suppl No 169 7 pp 6 coloured figs on 2 pls [13 ref.]

The author describes changes in the mucosa of the cheek which in view of the results obtained with riboflavin therapy he suggests are a manifestation of ariboflavinosis. These changes vary in degree. (1) The mucosa has an oedematous appearance the normal capillary net work and characteristic epithelial pattern are obliterated but there is no colour change. (2) The mucosa becomes an opalescent milky colour and the surface has a irregular cobble stone appearance the occlusional line becomes marked and indented by the teeth. (3) The mucosa has a pronounced whitish or grayish white colour is much thickened at times even heavy desquamation occurs and punched out shallow non tender and non inflammatory erosions appear.

A third of a group of persons examined in a survey exhibited the condition—(1) 27 (2) 54 (3) 30 total 109 out of 1061.

[Others will recognize these mucosal changes but some doubt must exist as to the diagnostic value of riboflavin therapy as given by the author.]

H S Stannus

HAEMATOLOGY

VAN DER SAR A. *Anemia con eritocitos en forma de hoz en la gestacion* [Sickle-cell Anaemia in Pregnancy]. *Rev Pol clin ca Caracas* 1943 v 12 No 68 12 pp 2 figs [19 refs.]

There is much yet to be learnt regarding sickle-cell anaemia hence all good records of cases are valuable at present. Sickle-cell anaemia is very largely almost exclusively a disease of the negro race. Between 8 and 9 per cent of the negro population of North America have been shown to exhibit this trait and 15 per cent of these suffer from anaemia. Among others it is very rare but cases have been reported in a Greek in Sicilians (two) and in Italians (two). Its presence

among pregnant women is practically limited to younger mothers because those with this condition usually die of it or of some intercurrent disease before attaining the age of 30 years. From the records the youngest was 18 the oldest 30 and the average 22.4 years. The chief features of the blood are a reduction of red cells to about half the normal with corresponding fall in haemoglobin so that the colour index is about unity. There is an increase in reticulocytes and a considerable number of erythroblasts with a marked leucocytosis.

The patient in the present record was a negress a native of Saint Eustatius Leeward Islands and born in 1913. In 1939 at the age of 26 years she came to hospital pregnant and suffering from severe anaemia. She had been pregnant twice before the first ended in an abortion at three months the second resulted in the birth of a boy at term now five years old and healthy. Now the anaemia was marked with widespread oedema and a transfusion of 500 cc blood was given. *Male twins were born prematurely at seven months both dead.* She left hospital two months later in February 1940.

In January 1941 she again presented herself at hospital anaemic and again pregnant four months. The blood pressure was 102 mm systolic 60 mm diastolic liver and spleen were both enlarged (the liver had been but not the spleen on the previous occasion). She was not seen again till June when she was very short of breath anaemic and suffered from palpitation. She was treated with intramuscular injections of a liver preparation (not stated which) and she made excellent progress and gave birth to a child at full term. She left hospital the following month. Examination of the child's blood showed no signs of any sickle cells.

H Harold Scott

DHAYAGUDE P G Erythroblastic Anemia of Cooley (Familial Erythroblastic Anemia) in an Indian Boy *Amer J Dis Children* 1944 Apr v 67 No 4 290-93 [11 refs]

DERMATOLOGY AND FUNGOUS DISEASES

FURNELL M J G Foot Lesions in Africans *Trans Roy Soc Trop Med & Hyg* 1943 Dec v 37 No 3 217-20 5 figs on 1 pl

So called 'jaws of the feet' was a common cause of rejection of West African recruits for military service as there was some doubt about the nature of this condition the author examined the foot lesions found in African soldiers most of whom belonged to the Northern Territories of the Gold Coast. The following conditions were commonly seen —

1 *Cracked soles* — The skin showed long cracks sometime forked at an acute angle with the skin. They are relatively painless and are probably due to excessive drying and trauma from sand particles.

2 *Pitting of the thick skin of the sole* — This seems to be the same as the condition called by CASTELLANI *keratoma plantare sulcatum* [see *Manual of Tropical Diseases* by CASTELLANI & CHALMERS 1919 3rd ed. Bailliere Tindall & Cox London p 223]. It consists

of small round holes in the skin and is probably caused by minor trauma as by walking on hard gravel associated with frequent wetting of the feet

3 *Corns (verruca plantaris)* — This was the only really painful condition met with

4 *Rat bite* — This was caused by the nibbling of rats while the man was asleep

5 *Disease of the skin of the instep* — A scaly condition was seen in two men

6 *Cystosion effect* — It is a very common condition a round area with concentric circles is seen especially on the heel It is due to grinding the heel into the laterite during foot-drill

7 *Other lesions of the foot* — These included guineaworm infection blisters and other minor traumata

Treatment with arsenic and bismuth for yaws had little effect on the lesions but improvement followed permission to wear sandals The author regards sandals as an ideal preventive against the skin lesions though they are less protective than boots against snake bites jiggers leeches and other injuries

J F Corson

BRICENO ROSSI A L & IRIARTE D R Breves notas sobre últimas investigaciones verificadas en las zonas pintóreas de Venezuela en relación al estado actual del conocimiento del Carate o Mal del Panto [Recent Studies in the Pinta Regions of Venezuela] Bol Laboratorio Clinica Luis Razetti Caracas 1944 Mar

4 No 13 291-35 - figs. [53 ref.]

Lesions described by LEÓN y BLANCO under the designation *pintids* are known locally in Venezuela as *toto* or *carampancho* Regarding the etiology the authors have come to the following conclusions —

- 1 Pinta may start with dermal lesion erythematous, squamous, lichenoid or papular designated *toto* or *carampancho*
- 2 For diagnosis the spirochaete must be looked for by dark ground illumination
- 3 Carampancho (pintid) in which the spirochaete is found must be treated as for syphilis
- 4 Those in which the spirochaetes are not found call for treatment with ointments having a salicylic acid base as for case of dermatomycosis
- 5 If a patient with *carampancho* in a pinta region does not get well with salicylic acid ointment the lesion is almost certainly an early *pintid* and should be treated with injections of bismuth

Serological studies have shown that active pinta with spirochaetes present gives in all cases positive results with the Wassermann Kahn Kline and other tests for syphilis also old cases with or without spirochaetes which have undergone spontaneous cure leave lesions like vitiligo give positive serological tests in 50 to 81 per cent

As regards the vector examination of large numbers of Simuliidae has not revealed the presence of spirochaetes other insects such as *Phlebotomus*, *Culicines*, *Anophelines* and ticks are being examined but the authors are inclined to believe that transmission is by contact prolonged and intimate as in the case of leprosy They suggest again that those engaged in anti-yaws campaign should at the same time undertake anti-carate work

H Harold Scott

BRICEÑO ROSSI A L & IPIARTE D R Breves notas sobre ultimas investigaciones verificadas en las zonas pintogenas de Venezuela en relación al estado actual del conocimiento del carate o mal del pinto [Notes on Pinta in Venezuela] *Rev Sanidad y Asistencia Social* Caracas 1943 Oct v 8 No 5 1001-13 4 figs on 2 pls {33 refs}

Study of the healthy parts of the skin of pinta subjects and of the skin of those with non dyschromic lesions has not resulted in the finding of any pinta spirochaetes. The primary lesions are some six times as frequent on the limbs as on the face or covered parts. Pinta lesions not associated with the presence of the spirochaete rapidly clear up on treatment with ointments having a salicylic acid basis but if the spirochaete is found these ointments have no effect and bismuth or an arsenical is necessary. Pinta subjects may have suffered from yaws or may do so later proving that there is no immunological relationship between them. Since however the same lines of treatment are effectual in both the suggestion is made that campaigns instituted against yaws should at the same time undertake to deal with pinta.

The question of transmissibility and in particular of a transmitting insect vector is still unsolved. *Phlebotomus* culicines anophelines ticks etc have been tested so far without any definite findings. In consequence it is suggested that carate may have a long incubation period like leprosy.

H Harold Scott

RODRIGUEZ NAVARRO W Tratamiento del carate [Treatment of Pinta] *Rev Sanidad y Asistencia Social* Caracas 1943 Oct v 8 No 5 1093-4

The author gives details of the method of treatment he adopts in cases of *mal del pinto*. He divides his patients into three categories (1) Those in the early stage when the disease is first recognizable. To these he gives ten ampoules of bismuth subsalicylate each of 1 cc containing 10 cgm and injects one each week. The spirochaete he states is not found after the sixth injection. (2) Those whose disease is of not more than two years duration. To these he gives a series of bismuth injections followed by a series of arsenicals [nothing further is specified as regards either dose or number of injections]. By this time no spirochaetes are found and the patient is no longer infective (sanitariamente curado) but a second series of both drugs is given to ensure real cure (medicamente curado). (3) For those in later stages that is of over two years duration treatment is varied according to age. For those under 40 years he gives a series of bismuth injections followed by a series of arsenicals and a second of bismuth then after an interval of four weeks he gives a third series of bismuth injections. For those over 40 years he gives three series of bismuth injections separated by intervals of a fortnight. [The paper loses much of its value owing to omission of the name of the arsenical used the dose of it or the number of injections in a series. For the second or third class these details are not given for the bismuth either but presumably the dose and course laid down for the early cases are implied as constituting a series for the other two.]

H Harold Scott

HIRCH J M Dermatitis Venenata caused by *Semecarpus atra* *U S Nav Med Bull* 1944 May v 42 No 5 1111-15 2 figs

More than one member of the Anacardiaceae are liable to set up a contact dermatitis. *Semecarpus anacardium* the marking nut

(so called because the juice of the nut is used for marking clothes) has been shown to be one cause of the well known Dhobie itch of the tropics [see this Bulletin 1944 v 41 230-1]

The cases referred to in this account arose from contact with another species *Semecarpus alata* and not with the fruit but with the trunk of the tree. It grows freely in New Caledonia the Loyalty Islands Isle of Pines and the New Hebrides group. It has a straight trunk 30 feet or more in height with widely spreading branches leaves dark green above glaucous below and with a red fruit shaped like the cashew nut (another member of the same family Anacardiaceae). If the bark is removed for any purpose such for example as for camp construction or is injured a sticky milky latex is exposed or exudes and becomes black and tar like (this is used for making Chinese lacquer). This latex is the noxious substance.

The author relates that about half of a number [unstated] of men engaged in erecting a mess hall using this wood as the timber for its construction suffered from a serious dermatitis starting as a pruritic erythema then presenting closely packed superficial vesicles. The entire body to three days became flaccid ruptured and coalesced to form an extensive oozing surface a self propagating eczematous condition from auto-inoculation and local spread lasting for two perhaps even up to four weeks before subsiding. Cases were most often seen in the summer months and the symptoms were more severe when the skin was wet from rain or sweat.

Both in accidental cases and in volunteers who offered themselves for experimental testing of the latex the interval before the onset of symptoms might be prolonged to as much as five days. The erythema was never seen in less than 48 hours after contact. The usual treatment by lotions and in the eczematous stage by soothing emollient preparations brought about a cure. The native method is to apply powdered charcoal to the areas involved and to leave this until the crusts separate—as a rule in about a fortnight.

H. Harold Scott

MARTIN W. P. & SILBER B. Histoplasmosis of Darling (Reticulo Endothelial Cytomycosis). Case Report. *Amer J Clin Path* 1944 Feb v 14 No 2 119-24 3 figs

The case described illustrates the difficulty of diagnosing histoplasmosis on clinical evidence alone unsupported by the findings of the pathologist or mycologist. The patient a woman aged 39 had been suffering from diabetes for about ten years. During the last year of her life she was admitted to hospital for examination no less than ten times suffering from fever abdominal pain dysuria and loss of weight. Apparently the only objective signs found were enlargement of the liver and spleen and some evidences of bronchopneumonia. No clinical diagnosis was reached and shortly after the tenth admission to hospital an exploratory laparotomy was performed with fatal result. At autopsy granulomatous lesions were found in the lungs liver spleen adrenal and kidney. Microscopical examination showed in some of these granulomata small collections of capulated Gram positive intracellular organisms which were identified as *Histoplasma capsulatum*.

J. T. Duncan

MISCELLANEOUS

MONTHLY BULL. MINISTRY OF HEALTH & EMERGENCY PUB HEALTH
LAB SERVICE (DIRECTED BY MED RES COUNCIL) 1944 July
v 3 108-10 Disinfestation of Aircraft and Aerodromes Report
of the British West Indian Quarantine Conference, Trinidad

The problems of preventive medicine due to air transport increase daily and a summary of the report of the Technical Sub Committee dealing with disinfestation of aircraft which was appointed by the Quarantine Conference held at Port of Spain Trinidad in November 1943 will interest many medical officers. The Technical Sub Committee consisted of P G Stock (Ministry of Health Chairman) G Beaver (Rockefeller Foundation) G L Dunnahoo (Asst Surg Gen USPH Service) T J Hallinan (DMS Jamaica) J D Long (Pan American Sanitary Bureau) N M MacLennan (DMS Trinidad) F P Schuitemaker (Dutch East Indies) R C Shinnon (Rockefeller Foundation) M C Stayer (Maj Gen US Army Med Service) R O Williams (Acting Director of Agriculture Trinidad) T L Shinnick (USPH Service) F H Forman and M C Arner (Pan American Airways) and R Norris (Secretary). It was appointed to consider the spraying of aircraft and the keeping of aerodromes free from mosquitoes.

The main conclusions reached were the following —

As regards methods of spraying

(i) Military planes should be dealt with on similar lines to civilian planes

(ii) Cargo planes which in many cases also carry passengers present special difficulties

(iii) The most practical method is to spray aircraft on the ground prior to departure

(iv) If spraying is thoroughly carried out with an efficient insecticide after all baggage and mail has been loaded and immediately before the passengers enter the plane the residual spray will be sufficient to kill insects which might enter with the passengers. The embarkation of passengers should be carried out as quickly as possible. It should be completed and the plane closed before the ventilating system is brought into use.

(v) After the main disinsectisation has been carried out on the ground a further spraying in the air may be advisable as an added precaution to ensure the destruction of insects which may have entered the plane. Such additional spraying is specially important if any delay occurs in the embarkation of passengers or if the plane be traversing or departing from a particularly dangerous area.

(vi) Disinsectisation is best carried out by dispersing the insecticide in a low boiling solvent. Freon * The next best method is by power spraying but failing the necessary apparatus use the best sprayer available to obtain as fine a mist as possible.

Freon or dichloro difluoro methane (which is used as a refrigerating agent) is a low boiling solvent and the pressure of the solvent is used for the spraying. Little equipment is needed for the production of aerosols by this method but the container must have a liquid delivery tube extending to the bottom since the solution and not the gas is to be sprayed. Only a small orifice is used so that no expansion takes place until the solution is sprayed into the atmosphere. Aerosols produced by this method are much more finely divided than the mists produced by most spraying methods and they settle more slowly. (Editor)

[October 1944]

As at present supplies of Freon are limited power spraying should be used for ground disinsection of aircraft and such supplies of Freon as are available should be reserved for the spraying of aircraft during flight.

(vii) All enclosed spaces should be dealt with particularly the luggage passenger and crew compartments including lavatories and other cabin accommodation. Particular attention should be paid to the potential harbour areas at the rear of the passenger planes by the use of hangar cloths in the case of choice. The quantity required per unit of air space depends on the method of application but as a general rule 8 cc of the standard pyrethrum extract (9 grams of pyrethrin per 100 cc) should be used per thousand cubic feet of air space with an exposure time of not less than five minutes. It is emphasized again that efficiency depends on the quality of the finely atomised insecticide to kill mosquitoes being sprayed to each part of the space to be dealt with.

If pyrethrum is not available an amount of an approved insecticide which will give equivalent results to the foregoing standard may be substituted.

(a) It is important that

adequate to carry out disinsection at every airport at which an aeroplane might alight.

(b) The responsibility for spraying therefore should be placed on the flight personnel whether the operation is carried out on the ground or in the air.

(c) The work should be under the general supervision of the health authority of the aerodrome.

(d) An entry that disinsection has been carried out should be made in the journey log book or other appropriate document.

(e) It is of great importance to keep aerodromes free from mosquitoes and other insect vectors of disease as routine spraying of aircraft cannot be relied on as 100 per cent effective.

(f) Apart from airport buildings a building free zone of at least a quarter of a mile should as far as practicable be maintained at airports. All buildings in the vicinity should be supervised to prevent their constituting a menace to the aerodrome through mosquitoes, rats and other vectors of disease.

As regards specially dangerous areas

The classification of areas is as discussed but the conference considered that sufficient knowledge is not yet available to enable definite recommendations to be made. The matter is of such importance that it should be dealt with by an international body.

Meanwhile if an epidemiological bureau is established for the British West Indian area representatives of that bureau and of the Pan American Sanitary Bureau could advise on the classification of areas and as to the necessity of spraying in pre-determined localities.

The question of quarantine measures against vectors of plant diseases was also discussed with Mr Williams the Acting Director of Agriculture Trinidad. It appeared however that the measures to be taken in this regard are generally different from those required to be taken against

mosquitoes and the Committee concluded that the Conference should not attempt to make specific recommendations in this respect

Finally the Committee emphasized that their recommendations and opinions were based on present knowledge and that these recommendations may require modification in the light of further knowledge

MEGAW J W D Hints on Health in India 1942 27 pp

There are few people so competent as the author of this pamphlet to write of conditions in India with the authority that comes not only from long residence but also from critical and active interest in medical science. The pamphlet is intended for laymen and in it the author has overcome the difficulties of presenting to the uninitiated the bare bones of disease transmission while maintaining at once interest and scientific accuracy. The subject is apposite at the present time and a gift of this small publication to each soldier travelling to the Far East might do much to minimize the disease rates of the forces engaged in that theatre of war.

The subject matter is divided into two main sections on the maintenance of physical fitness and the avoidance of preventable disease. Climate, clothing, housing, exercise, diet, alcohol, smoking and work are dealt with in the first section and the advice given is plain, direct and wise. In the section on preventable diseases the alimentary infections, droplet diseases, insect borne diseases, contact diseases, helminthic infections, heat stroke, snake bite, dog bite and other matters are dealt with in the same brief and authoritative style. It is good to see that some of the old bogeys are destroyed—red spine pads, the necessity for wrapping up in a thick coat after hard exercise—but the reviewer would have welcomed the last obsequies of the cholera belt, here only half buried.

The pamphlet can be recommended to all persons travelling to the East

Charles Wilcocks

HILLMAN C C Medical Operations in the Pacific Theaters, Virginia Med Monthly 1943 Dec v 70 594 [Summary prepared for War Medicine Chicago]

Hillman points out that military service, especially in overseas theatres, tends to bring out potential emotional deficiencies. Notwithstanding much more careful selection of inductees than that practised in World War I and intensive efforts to eliminate the emotionally weak among trainees at replacement training camps, psychoneuroses have constituted a major cause of non effectiveness. Distance from home, general absence of facilities for recreation, discomforts of a tropical climate and rigors of combat appear to be the principal factors.

Fear reactions, mutism, tremors, exhaustion states and other acute psychoneuroses have occurred during combat. In the Pacific areas, as in other theatres, prompt sedation, rest and adequate nourishment have been most effective.

Among tropical infections, malaria stands out as the arch enemy. There is no other disease which so vitally affects the war effort. It has produced much more ineffectiveness and many more hospital admissions in some theatres than have battle casualties.

men have been floated down jungle streams on pneumatic life rafts. In most instances however primary evacuation has been accomplished by hand carried litter. It is at this point that the native carrier accustomed to carrying packs long distances through slippery jungle has proved invaluable. Secondary evacuation has been effected largely by air.

BRAZZAVILLE [AFRIQUE FRANÇAISE LIBRE] Rapport sur le Fonctionnement Technique de l'Institut Pasteur en 1942 [CECCALDI J. Director] [Report on the Work of the Pasteur Institute in 1942] 80 pp 6 figs & 4 charts Brazzaville Imprimerie officielle de l'A.E.F.

The war prevented the Pasteur Institute at Brazzaville from obtaining vaccines and sera from the parent institute at Paris. The whole time of the two doctors the Director and his colleague was taken up with the various activities of the institute which included water analysis microbiological and serological examinations antibiotic vaccination histopathology the preparation of various vaccines the collection of snake venom and sleeping sickness work. The experimental animals maintained at the laboratory were white mice (1 500-3 000) white rats (200) rabbits guinea-pigs monkeys sheep fowls and pigeons.

Vaccines and sera—Epidemics of cerebrospinal fever occur every year during the dry season and large quantities of vaccine are used. 438 400 cc were prepared in 1942 and antimeningococcal serum was also produced. Considerable quantities of vaccines against rabies pneumonia staphylococcal infections plague and typhoid fever were made.

Snake venom—Dried venom of *Bitis gabonica* and *B. nasicornis* was prepared in considerable quantity and sent to Dr Grasset at the South African Institute for Medical Research Johannesburg antisera were made there and sent to the French African colonies.

Abortus feter—Details are given of a case in a European woman at Brazzaville who became infected by drinking milk from a recently imported herd of cattle [this case has already been noticed in the *Bulletin of Hygiene* 1944 v 19 527].

Sleeping sickness—New cases numbered 147 only 44 being in the first stage the majority were sent to the laboratory from various dispensaries or by officials. It is well known that when doctors tour the infected areas about 85 per cent of the new cases are in the first stage of the disease whereas when the patients are first examined after being sent to the laboratory or after coming of their own accord from 80 to 100 per cent are found to be in an advanced stage. Early cases were treated in a variety of ways with different drugs—270 F (acetarsol or stovarsol) tartar emetic tryparsamide moranyl [Tourneau 309 or Germanin]. Six weekly doses of 270 F 0.5-1 gm + moranyl 0.25 gm are stated to have been insufficient but 12 weekly doses gave satisfactory results. In one case the trypanosomes were still present in the blood after the sixth dose. The advanced cases also were treated with various combinations of drugs. Notes are given of 17 fatal cases the duration of the disease ranging from two months to 14 years all received courses of tryparsamide as well as other drugs.

A few pages are devoted to records of animal and agricultural research.

J. F. Corson

(For the Yellow Fever section of this paper see above p. 846.)



HUDSON E H The Role of the Reservoir Host in Tropical Disease
Amer J Trop Med 1944 Mar v 24 No 2 125-30

In four tables the author gives information (admittedly incomplete) concerning the reservoir hosts of the following groups of parasites affecting man helminths protozoa (including spirochaetes) bacteria (and moulds) and viruses (including rickettsiae) Each table is subdivided into three sections dealing with the mode of infection whether by ingestion by vectors or by contact A reservoir host is defined as a lower animal which shares some disease or parasite with man and the author distinguishes between reservoir hosts and vectors

From the tables it is observed that most helminthic infections are acquired by ingestion most protozoa by way of vectors bacteria by all three routes and most viruses (including rickettsiae) by vectors In civilized communities in temperate climates there are still animal reservoirs of tularaemia plague tick borne and flea borne typhus leptospirosis rabies brucellosis and equine encephalomyelitis but the principal diseases are those indigenous to man In the tropics however the position is very different and the animal reservoir host plays a prime rôle

The author asserts that in many respects interest in tropical disease has been concerned too much with the white man in the tropics and too much with the clinical aspect He urges a wider more biological outlook and a greater attention to environmental study and in that study the reservoir host will bulk large

Charles Wilcocks

WHITLEY G P Poisonous and Harmful Fishes (Division of Fisheries—
Report No 10) Commonwealth of Australia Council for Scientific
and Industrial Research Bull No 159 28 pp 16 figs & 3
coloured pls 1943 Melbourne Govt Printer

This is an excellent short monograph on the fish to be avoided or handled cautiously in the waters of Australia and the south western Pacific Visitors immigrants and members of the Allied Forces in these regions are often unaware of the risks to which they may be exposed and this work will give them all the enlightenment they need It is written in plain simple language for it is designed for the instruction of non medical persons though doctors also will profit from reading and studying it When a stranger in a new country sees an attractive or peculiarly coloured fish he usually wishes to catch it if not for food to add to his collection This booklet warns against the careless handling of unknown fish and against regarding all fish as suitable for food

The author describes and depicts harmful fish under three categories (1) Those whose flesh is poisonous either inherently so from toxins in the tissues or from bacterial contamination—a source common to all foods Susceptibility on the part of the subject—allergy to certain fish as food—also receives mention Some fish are poisonous as food at all times as for example certain of the Tetraodontidae others are so at certain times or to certain persons as *Lethrinus* and *Epinephelus*

(2) Venomous fish which are actively or defensively venomous owing to erectile spines on the fins with bags of poison at the bases these bags are pressed upon when the spines are erected and poison is

injected into the wound which the spines themselves inflict. Several belong to the Synbranchidae and Scorpaenidae. The flesh of these is not poisonous—they are edible.

(3) Predaceous or aggressive fish dangerous because they attack man and may cause wound fatal from shock and haemorrhage such as sharks and Barracuda.

Little is said about symptoms set up by the poison and only a few general principles are mentioned regarding treatment—in short little beyond first aid as is proper in a book intended mainly for the non-medical reader. A few hints for collectors are also given in order that specimens may be properly preserved for sending to headquarters for identification. A more detailed and technical account is promised for early issue and this will be awaited with much interest.

H. Harold Scott

LILLIE P. D. Some Experiments on the Romanovsky Staining of Blood Films. *J. Lab. & Clin. Med.* 1943 Dec. v. 25 No. 15 1872-5

Tests were made of several samples of Wright's and Giemsa's stains using various dilutions and staining times. The blood films were fixed in methyl alcohol and a phosphate buffer of pH 6.5 and used with the stains. The blood of white rats heavily infected with *T. panosoma equiperditi* was used for the experiments and some tests of the stains were also made with films of patients infected with *Plasmodium vivax*. A Giemsa stain was prepared in the laboratory by a method of which details are given and was found to be equal to or better than the commercial stains. The author formed the following conclusions from his experiments—

1. Wright's staining solution (125 mm stain to 100 cc methyl alcohol) when diluted with water to 1:4 and 1:9 and applied for 15 to 30 minutes gives results equal to those obtained with Giemsa's stain.

2. Previous fixation in 80-100 per cent methyl alcohol and staining with pre-mixed dilutions of Wright's or Giemsa's stain is the best method.

3. The addition of 7.5 per cent of acetone to Giemsa's stain decreases the staining time to about half using 1:10 Giemsa's stain with 7.5 per cent acetone thin blood films are stained in 5 minutes and thick films in 5-6 minutes.

J. F. Corson

YAROM J. Remittent Rural Fever (*Febris remittens agricolarum*). *Harefuah* Jerusalem 1944 Apr. 16 v. 6 No. 8 [In Hebrew 143-5; chart English summary 145-6].

The author records an outbreak of a specific fever among the pupils and staff of the Mikveh Israel Agricultural School which occurred early in 1940. He studied 254 cases which occurred in 212 pupils (out of a total of 397) 56 members of the staff (out of a total of 196). There were two peaks in the epidemic—one in January and another after an interval of six weeks in March. A small number of cases occurred between September 1939 and January 1940.

SYMPTOMS

The disease commences with a complaint of headache and debility. The initial rise of temperature is slight. On the 3rd day or so the temperature reaches its peak (up to 40°C). The temperature is characteristically remittent—the temperature rises to maximum in the afternoon

and may be accompanied by a rigor followed by sweating and remits in the evening. In some cases where the temperature was taken frequently a secondary rise was found to occur during the late evening or at night. During the daily period of temperature the patient was depressed, had no appetite and complained of headache usually supra orbital and muscular pains. The conjunctiva was congested and the face flushed. Immediately before and after the rise of temperature the patients feel remarkably well, have a good appetite and are cheerful. This feeling of well being during the apyrexial period is considered to be of importance for the differential diagnosis between rural remittent fever and infective hepatitis. The duration of illness (considered in days with pyrexia) is 4 to 12 days. In 90 per cent of the cases the duration was 4 to 8 days, in 4 per cent up to 12 days, in the remainder including what were considered to be abortive cases less than 4 days. In 5.4 per cent of the cases the fever was continuous for 3 or 4 days and was subsequently remittent. The pulse is relatively slow in view of the temperature.

The spleen was palpable in all cases even in the early stage of the disease and in a few cases reached to two finger breadths below the costal margin. The liver was enlarged and in some cases tender on palpation.

Blood changes. A slight leucocytosis with a shift to the left in the early stages followed by a leucopenia and a relative increase in the number of large mononuclears (up to 10 per cent).

Urine. Traces of albumen were found. In the early stage urobilinogen was also found.

Complications. ulcerative stomatitis was seen in 6 cases.

In one case there was impairment of hearing during the disease followed by complete recovery.

Relapses. Only one relapse was observed eight days after the initial remittent fever which lasted eleven days.

EPIDEMIOLOGY

A study of the epidemiology brought out the following facts:

(1) Contact infections could be excluded in the overwhelming majority of the cases. Infections via food and drinks can also be excluded.

(2) 62 per cent of the cases occurred in students who had fairly recently come from Europe.

(3) Of the other cases the overwhelming proportion occurred in boys and in staff who came from towns in Palestine.

(4) Very few cases occurred among children previously brought up in agricultural settlements or in workmen who had worked for long periods on farms. It is therefore concluded that this section of the local population was immune owing to previous attacks in contrast to townfolk who were not immune probably because they had not previously been exposed.

(5) No cases were observed among agricultural labourers originating from Turkey, Persia and Mesopotamia. It is considered that the disease occurs naturally in these countries.

(6) There was no evidence of insect transmission. The nearest suburban districts containing non immune recent arrivals were not affected.

(7) It is considered that the reservoir of the disease is a rodent living in fields probably a *microtus*. Field mice were a pest immediately

as there was a tendency for the infection rates to increase after several years stay in hospital.

C M Henson

See also p 859 BALMANN Eosinophiles In Pleural Effusion with Transient Eosinophilic Pulmonary Infiltration

DAVID W A L & BRACEY P Activation of Pyrethrins in Fly Sprays
Nature 1944 May 13 545

Activators are non toxic substance which increase the effectiveness of pyrethrin sprays. In an attempt to explain the nature of their action the authors analyse the many factors involved in the killing of flying insects with a spray. All the experiments were done on *Aedes aegypti* under controlled conditions in a spray chamber. They show that the insect picks up its dose of insecticide by impaction with droplets during flight. Mosquitoes deprived of the wings or narcotized with chloroform are little affected by the spray mist and such sedentary insects are killed when the mist is drawn past them at about 3 miles per hour not when the same volume is drawn past at 0.3 miles per hour. There seems to be an optimum droplet size (of about 10μ) for securing maximum kill: if the droplet is too small impaction with the insect does not take place; if it is too large the toxic principle is quickly lost from the air space by sedimentation. On the basis of these conclusions the authors find that one factor in the activation of pyrethrins is a simple physical one leading to the persistence of droplets in the air. All the activators are substances of low vapour pressure. Hence the droplets remain when the more volatile kerosene carrier has evaporated. A list of this type is given by oleic acid, lubricating oil, sesame oil free from sesamin. But the authors make it clear that there are other factors in activation besides these physical ones. Thus activation is shown by pure sesamin without a heavy oil carrier.

I B Higglesworth

PARKIN E A & GREEN A V Activation of Pyrethrins by Sesame Oil.
[Correspondence Nature 1944 July 1 16]

The authors have failed to demonstrate any activation of pyrethrins in sprays used against the house-fly by the incorporation of lubricating oil or of sesame oil free from sesamin. DAVID and BRACEY [above] have found that as used against mosquitoes (*Aedes aegypti*) sesame oil activates pyrethrin sprays not only by some specific property of the sesamin it contains but also by its being non volatile and so ensuring the persistence of a mist of fine droplets. In tests on the house-fly only the former effect can be demonstrated. [It is not certain whether this difference is due to the different insect species used or whether it is due to the fact that in Parkin and Green's experiments very large doses of spray were used and the flies were introduced into the test chamber before spraying—factors which would tend to eliminate the effect of persistence of the spray droplets.]

I B Higglesworth

SNODGRASS R E The Feeding Apparatus of Blin® and Disease-Carrying Flies—a Wartime Contribution to Medical Entomology
Smithsonian Misc Collections Washington 1943 July 19 v 104
 No 1 51 pp 18 figs [38 refs.]

In this paper is brought to light in a concise form all that is at present known about the structure and the mechanism of action of the

mouth parts of the blood sucking Diptera and of the house flies and their allies. The paper is very well and fully illustrated. Short notes are given on the habits and medical importance of each group of flies.

I. B. Wigglesworth

LEVER R. J. A. W. Entomological Notes. Agric. J. Fiji. Suva 1943 v. 14 No. 3 77-83 [22 refs.] [Summary taken from Rev. Applied Entom. Ser. B 1944 May v. 32 Pt. 5 102.]

There was a fairly heavy outbreak of dengue in Suva in May and June 1943. The disease occurred in Fiji in 1885 and again in 1908 when it was apparently introduced from Queensland. records of its distribution in other islands in the Pacific are cited from a recent publication and notes are given on the breeding places of *Aedes aegypti* L. the vector. An experiment in the New Hebrides showed that *Anopheles punctulatus* Don. could develop in samples of water from Suva. Larvae of *Aedes scutellaris pseudoscutellaris* Theob. and *Culex fatigans* Wied. from Suva were reared to the adult stage in water from two rivers on the northern coast of Guadalcanal having pH values of 7.31 and 5.57 respectively and 1.1 and 0.8 parts chlorides per 100,000 but all died in the water of a third river that had a pH of 7.07 and 1.880.0 parts chlorides per 100,000. Nitrates were not a factor. Notes are given on the breeding places of a number of other Culicine larvae. Normal adults of *C. annulirostris* Skuse were reared from young larvae placed in brackish water that would have repelled ovipositing females of this species in nature. A dust containing 1 per cent Paris green failed to control *C. fatigans* in a slowly flowing stream and one containing 2 per cent did not give a complete kill.

ROUBAUD E. & GRENIER P. Simulies de l'Ouest Africain (Afrique équatoriale et occidentale françaises) [Simuliidae of West Africa] Bull. Soc. Path. Exot. 1943 Oct. 13 v. 36 No. 9-10 281-311 11 figs & 10 pls [23 refs.]

Four new species (*S. monoceros loangolense djallonense* and *altipartitum*) are described and notes on ten previously described species are given as the result of the study of a collection of material from Moyen Congo (collected by French Sleeping Sickness Commission 1906-1908) from Dahomey (collected by Bouet & Roubaud 1909-1912) and some other sources. The authors stress the importance of the external genitalia in the discrimination of the species of Simuliidae and they describe and figure the male and female external genitalia of *S. damnosum* Theob. in some detail as a standard for comparing the others with. There are no keys for the determination of species either as adults or as pupae.

Previously apart from scattered notes two papers by POMEROY (Ann. Mag. Nat. Hist. 1920 v. (9) 6 72-80) and Bull. Ent. Res. 1922 v. 12 457-463) and DE MEILLOU's summary of the African species (Bull. Ent. Res. 1930 v. 21 185-200) contained all that was known of West African Simuliidae. The present paper is a valuable contribution to the knowledge of the Simulid fauna of the region. John Snart

VAN SOMEREN G. R. C. Some Records of Simuliidae in Abyssinia and British Somaliland. Bull. Entom. Res. 1944 July v. 35 Pt. 2 113-14

insisting that the experiment must be conducted in an approved institution. Consequently and presumably owing to such restrictions the author says little regarding the nature and composition of the different poisons or of the physiological effects of the several constituent of mixed poisons (as has been done for snake venoms which some fish poisons are said to resemble in their effects) beyond the fact that some are haemolytic in action while others are neurotoxic or cause shock, syncope and collapse.

The descriptions of the fish are good and the line drawings are excellent. These would have been even more instructive if some at least had been reproduced in colour. A number of plates demonstrate well the histological structure of the poison apparatus and the poison glands. A fuller index would have enhanced the value of the book. A book such as this calls for a particularly full and accurate index. The reviewer wishing to look up Scabbard Fish found in the Index merely "see also Black Scabbard" but this has no mention at all in the Index. The illustrations are very good but the lettering may have no accompanying explanation in the legend or the text as in Fig. 4 p. 103 and the majority make no mention of the scale or magnification of the drawing. Not one of the eight plates demonstrating the histology has any better indication than low power or high power. Nonetheless to conclude the book is highly interesting and should make a wide appeal. To the intelligent layman on account of the information general and peculiar which it imparts to the medical man also who wishes for an introduction into a fascinating subject and to the comparative anatomist. It contains a good deal of science and no little amount of speculation and is consequently a strong incentive to further scientific study.

H. Harold Scott

REED Alfred C. M.D. Associate Clinical Professor of Medicine
Stanford University School of Medicine & GEIGER J. C. M.D.
Director of Public Health San Francisco California. *Handbook
of Tropical Medicine* pp. ix+148. 1944. Stanford University
Press California & London. Humphrey Milford Oxford University
Press. 9s. 6d.

This book is intended to be a practical clinical guide for American doctors many of whom owing to the war will meet with tropical disease both abroad and at home of which they have little knowledge or experience. It is a book of 182 pages is of pocket size and is printed in relatively large type. Brief accounts are given of nearly all the diseases that are usually included in text books of tropical diseases. Leprosy, undulant fever, enteric fevers, a few virus diseases, snake bite and some other forms of poisoning are omitted. There are no illustrations and very few notes on laboratory methods of diagnosis. Cerebral malaria is not mentioned nor is there any reference to the treatment of malaria by intramuscular or intravenous injections. Sleeping sickness in Tanganyika Territory is stated to be caused by *Trypanosoma gambiense* although the Rhodesian form has been predominant there for over 70 years. In the reviewer's opinion this handbook cannot replace a good text book of tropical diseases which is indispensable in the circumstances for which the use of the handbook is intended. It would however be useful for a preliminary survey of the subject or for rapid revision. It is difficult to imagine conditions in which a good text book would be too large to be carried.

J. F. Corson

TROPICAL DISEASES BULLETIN

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MEDICAL ORGANIZATION AND DISEASES OF INDO CHINA

BEFORE THE JAPANESE INVASION

By Charles WILCOCKS M D M R C P D T M & H

Acting Director Bureau of Hygiene and Tropical Diseases

MEDICAL ORGANIZATION

The head of the medical services of Indo China is the Inspector General of Public Health under whose direction are the Provincial Health Officers and their subordinate staffs. In general except in some of the larger centres there is no distinction between Medical Officers concerned only with curative medicine and Health Officers concerned only with sanitation. It is thought that the native mind is not yet sufficiently educated to grasp the difference that the native expects any doctor to treat any disease and that he would not understand or have confidence in a medical man who was concerned only with public health. The policy adopted by the French therefore has been to make medical officers responsible for the purely public health aspects of medical work in addition to hospital practice.

The annual medical budget amounts to about 10 per cent of total expenditure.

There are about 110 European medical men actually at their posts at any one time not including the teaching staff of the medical school of Hanoi and 240 native medical practitioners principally Annamites who have received their training locally. Subordinate staff comprises hospital assistants dispensers nurses and midwives of the last there were 331 in 1927. There are over 450 medical institutions including European and native hospitals infectious diseases hospitals maternity institutions dispensaries and leper asylums. It is noted that in Cochinchina during 1921 about one third of all childbirths took place in maternity hospitals or were attended by qualified persons.

In addition to work in stationary institutions monthly tours of rural areas are conducted by the sick attendants. The object of these tours is not so much to give treatment to all the sick as to detect the cases and to direct them to the treatment centres. Preventive duties include vaccination against smallpox and cholera antimalarial

measures treatment of venereal disease and the spread of medical knowledge. Medical education is also part of the school curriculum and emphasis is laid on mothercraft and domestic economy.

Higher medical education is well organized. At Hanoi there is a medical school at which native doctors are trained. The course occupies four years and some of the students pass after graduation to medical school in Paris. Nurses and midwives are trained at Cholon dispensary at Hanoi.

There are two Pasteur institutes, one at Saigon and one concerned largely with veterinary medicine at Nhatrang in Annam. These institutes provide vaccines for several diseases and there are in addition vaccine institutes and public health laboratories at Hanoi, Hue and Phnom Penh. Smallpox lymph is prepared at Hanoi and at a vaccine farm in Laos.

Quarantine stations have been established at Haiphong, Tourane, Nhatrang, Saigon, Phnom Penh. At these centres the usual arrangements are made to inspect immigrants and to hold them in quarantine if suspected of infective disease. Clayton apparatus for the fumigation of ship and aircraft is available at several places. The public health service includes however not only these stationary institutions but also mobile units which though employed in connexion with matters of general hygiene and sanitation and with vaccination against epidemic diseases such as smallpox and cholera pay particular attention to the serious problem of typhoid. In Laos the health organization is still very imperfect but in recent years there has been a development in the use of aircraft for public health purposes. There is considerable movement of Annamite labour into Laos for the construction of roads and other works. To cope with this migration from the point of view of the introduction of infective disease several observation posts have been established on the labour routes.

INSECT BORNE DISEASES

Mal.—Over the greater part of the country it is probably safe to assume that every indigenous native suffers from malaria not once only but many times during his life. It is not possible to give any accurate account of the number of people who suffer actual attacks during any one year since the majority of these persons, as is inevitable in any country in which the strength of the medical staff is relatively low, are not seen by doctors who can carry out the examination necessary for accurate diagnosis but there are available figures of those treated in hospital for this disease which may be set against the total treated for all sicknesses. From these returns it was found that in 1937 malaria accounted for one-fifth of all hospital cases—from 15.7 per cent in Tonking to 28 per cent in Laos—and it is known that in medical institutions it causes in general more deaths than any other disease except cholera.

The distribution of malaria in Indo-China is not even and it provides a good illustration of the fact that low lying swampy ground is not always the most dangerous. Careful surveys of the country have been made by the French authorities and the results of these have shown that malaria is most prevalent in the foothill and mountainous districts of the whole country and in the high plateaux of the south and is least prevalent (though still present) in the great deltas of the Mekong and the Red River.

The explanation of this fact is to be found in the biological habits of the mosquitoes which carry the disease. Some species of *Anopheles* prefer swamp water others cannot breed unless the water is brackish others demand the small back waters of mountain streams open to the sun others must have shade and relatively cool water. Further the adult *Anopheles* mosquitoes vary in their feeding habits some prefer human blood and these are therefore the most dangerous others will seek out animals and for this reason if cattle or pigs or horses are at hand are less likely themselves to be infected even if for any reason driven to attack man. In the absence of animals however these mosquitoes will feed on man.

Thus in the delta of the Red River round Hanoi are found *Anopheles vagus* and *Anopheles hyrcanus* var *sinensis* both of which breed in swamps irrigation canals or rice fields but which are strongly attracted to animals. malaria is not very prevalent in this region. The same holds good of the delta of the Mekong near Saigon. In the hills and foothills however breeding conditions in the streams especially in the dry season when they are not torrents are favourable to *Anopheles minimus* *Anopheles jayporiensis* and *Anopheles maculatus* all of which are attracted to man and all of which are dangerous vectors of malaria probably for that reason.*

This matter is stressed here because of its importance to the health and efficiency of the natives of the country and also because of its bearing on the health of labourers and especially of those imported into malarious districts of whom if they have not acquired an immunity to the disease by constant infection malaria takes a heavy toll. Subtertian malaria is found abundantly in Indo China. The less common quartan malaria is relatively mild and its distribution is patchy. The geographical distribution of the three forms of malaria within Indo China is not uniform the reason for this is not clear but the fact is of considerable importance. Thus for instance in the delta of the Red River and the low lying country around Saigon benign tertian malaria is the type most commonly found though subtertian may occur in seasonal epidemics. In the highlands of Cochinchina the mountains and high plateaux of Annam the wooded mountains of Cambodia the highlands of Laos and Tonking and on the vast calcareous spurs of the latter subtertian malaria is predominant and wide spread. Blackwater fever is seen especially in the mountains of Annam and Tonking.

The effect of subtertian malaria on the population inhabiting these highly infected regions may be devastating. The children become infected in early infancy and in the absence of quinine or other specific treatment there is a high infant mortality. Even if the infants escape death they pass through long periods of ill health with recurring bouts of fever and consequent emaciation which is superficially concealed by the protuberance of the abdomen caused by the enormous enlargement of the spleen due to the disease. In districts in which the malaria is transmitted throughout the year immunity is acquired during childhood and youth and adult life is passed in a state of chronic infection which however is compatible with reasonably good health. If the disease is transmitted seasonally by reason of the seasonal increase of

This is not a complete list of the *Anopheles* of Indo-China. In addition *A. aconitus* *A. tessellatus* *A. barb. rostris* *A. philippinensis* and others are found but they are of less importance.

mosquito breeding due to climatic conditions the immunity acquired is to some extent lost in the periods of non transmission. The result is that in adult life the native suffer from the disease year after year and may be liable to blackwater fever. This peculiarity in the natural history of malaria is of very great importance in industry. There have been considerable movements of native labourers from areas where malaria is not common into plantations in these districts of high incidence and the result has been a high degree of disease and consequent loss of time and fall in production and where measures have not been taken to ensure adequate treatment a high death rate from the disease.

Preventive measures include the siting of labour and other camps away from mosquito breeding places the elimination of breeding by drainage by the clearing and periodic flushing of streams by regulation of shade by the covering of water with oil or Paris green and by means of drug administration to the labourers. With anti malarial drugs the French authorities in Indo-China claim highly successful results but drug prophylaxis (suppressive treatment) is usually combined with the other measures. It is most important that these matters be borne in mind if there is any question of movement of population or of troops.

Dengue—This is a mosquito-borne disease of little intrinsic importance which should however be borne in mind by medical men in Indo-China. The vector is the mosquito *Aedes aegypti* which breeds in domestic collections of water and which readily attacks man. This mosquito is the common carrier of yellow fever in the countries in which that disease is found so that if yellow fever were introduced into Indo-China there is every reason to believe that it would spread widely. With the development of air travel it is possible that infected mosquitoes or persons in the incubation (and infective) stage of the disease may be transported from Africa to India and the Far East to initiate epidemics in those countries. The measures in force in India and other countries to prevent the introduction of yellow fever are well known to health authorities to be effective the whole hearted support of the administrative services is necessary.

Plague—There are said to be three permanent foci of plague in Indo-China at Cholan Pnom Penh and in Kwan Chou Wan (Tsché kam and Tan Hai) respectively. The first is small the other two of greater importance all are in the Chinese communities of the places concerned.

Plague has also from time to time been introduced from abroad from Canton and Hong Kong and has spread from one part of the country to another for instance from Cochinchina to Annam. Plague is closely associated with grain stores and with ships and ports in all of which rats find suitable harbours and it is largely spread along commercial routes. The most dangerous rat is the black rat *Rattus rattus* because it frequents human habitations and the most efficient flea vector is *Xenopsylla cheopis*.

The common form of the disease is bubonic but there have been records from the island of Kassutin in the Mekong and from Vinh Long in Cochinchina outbreaks of the fatal pneumonic form.

Plague has occurred in all the countries of Indo-China the places particularly mentioned being Tourane Haiphong Lang Son Bac Ninh and Honay. In 1914 there were 2034 cases with 1587 deaths but in recent years the incidence has been less and it is not now regarded as a serious problem though its reintroduction from abroad is clearly

always possible. Antiplague vaccination has been performed on a considerable scale and anti rat measures have been applied in the permanent foci.

Typhus—Three forms of typhus are found in Indo China. The classical epidemic louse-borne type has been seen repeatedly in Tonking and outbreaks have occurred in the Hanoi gaol recalling significantly the name gaol fever applied to the disease in Europe in past years. Movements of refugees may provide conditions suitable to an outbreak but in fact large epidemics have not been recorded. The second form is that which is essentially a disease of rats and which is conveyed to man by rat fleas. It has been found in the rats of Saigon, Hanoi, Nam Dinh and Tuyen Quang and in man repeatedly in Cochinchina in Hue where in 1931 it was noted that the disease was relatively benign and in railway coolies in Annam in 1908. The third mite borne type a form probably identical with scrub typhus of Malay, mite fever of Sumatra and tsutsugamushi disease has been reported from Cochinchina especially in European prospectors from Annam where it is frequent in the Moïs and from Cambodia where 20 cases were recorded in plantation labourers in 1937. It is transmitted to man by larval mites found in scrub or bush country and may be expected in considerable amount in troops or labourers operating in such country.

Relapsing Fever—This disease has been recorded in Cochinchina and Annam recently but has not been seen in epidemic proportions for many years. In the early part of the century however epidemics did occur but treatment with salvarsan brought them under control. In Indo China this disease is conveyed by lice which are universal and is especially prevalent as is typhus under conditions of over population and poverty.

NUTRITION

The state of nutrition of the agricultural classes of Indo China is poor. For half the year the diet available for these people is just adequate in quantity though poor in quality but during the other half they exist on almost a starvation level. In general they know little food other than rice taken with salt or preserve. Other classes fare better. Vegetables, fish and meat are eaten in Cochinchina, Cambodia and S Annam more rarely in Tonking and N Annam. Fish is commoner than meat and freshwater fish, sea fish and shellfish are used. The commonest meat is pork and pigs are extensively bred, dogs are also used as food and buffalo meat is eaten, poultry are frequently kept and their eggs eaten. Besides rice the staple food, certain other crops are cultivated, maize is relatively widely grown, the soya bean is encouraged and with its rich protein and fat content is a valuable addition to the diet. From it are prepared soya milk and soya cheese. In addition manioc, yams, taro, sweet potatoes, beans, cucumber, China cabbage, sesame seeds, sugar cane and a number of vegetables are grown. Of the fruits the banana, lemon, pineapple and shaddock are most common but the orange, Chinese potato, pawpaw, bread fruit, coconut and mango are cultivated. This is a considerable list and the wealthier classes and the people in the districts where these foods are available obtain an adequate diet but the fact remains that a vast proportion of the 22 000 000 inhabitants exists on a diet of rice which in quantity is barely adequate.

Much polished rice is used in Indo China but fortunately the common native method of mulling rice is not so complete as the mechanical

method so that some part of the vitamin-containing layers of the grain is left. Nevertheless according to one authority 3 000 to 4 000 cases of beriberi are diagnosed each year and ten per cent of these patients die of the disease which ranks eighth in the list of diseases treated in hospitals. For the year 1937 the incidence figure of 25 706 cases is given in another report with 250 deaths. It is noted that the distribution of the disease is wide but that in Laos and Kwan^g Chow Wan it is not so prevalent since polished rice is not much used. In Cochinchina where the use of polished rice is increasing there are many grave cases especially between the ages of 20 and 45 in women after childbirth and in coolies. Treatment with vitamin B₁ gives excellent results.

There is a report to the effect that stone in the bladder is a common condition in young children. This may be evidence of vitamin deficiency and in India has been associated particularly with lack of vitamin A.

WATER SUPPLIES

The question of water supplies is closely bound up with disease in tropical countries. Not only do water borne diseases occur in epidemic form but water is essential for the breeding of the mosquito vectors of malaria filariasis dengue and in countries where it occurs yellow fever. In general the rainfall in Indo-China is plentiful but as rice is one of the staple crops irrigation is used and entails the construction of canals which provide a difficult problem in anti malaria work and since the natives use this water for drinking purposes in the control of water borne disease.

The domestic water supplies in the large cities are good they are carefully supervised and are distributed over piped systems there is therefore little difficulty in cities like Hanoi and Saigon and almost all provincial capitals. The sources of these city supplies are usually deep wells but in Hue and Phnom Penh river water after full treatment is used. At Haiphong the local water is brackish and the city supply is therefore obtained from the river 35 kilometres distant.

In the larger rural centres in hill country reservoirs pumping stations and distributing systems are being installed and water is obtained from rivers malaria drainage systems and other sources. Small purifying plants are gradually being introduced. In the course of time these measures may be expected to be highly successful and to exert a definitely beneficial effect upon public health but the matter is not everywhere so straightforward. In the delta of the Mekong and the Donnai the land is almost at sea level and is traversed by innumerable canals and watercourses which are largely affected by the tides. The water is therefore brackish and the line of demarcation between fresh and brackish water in these watercourses varies with the periods of the year. For drinking purposes therefore rain water is largely used and the natives have formed the habit of conserving water in ponds. Surface ponds must under these conditions inevitably be heavily contaminated. The existence of a considerable trade in water and water sellers whose methods cannot be satisfactory are common.

In the more remote rural districts where the supply is obtained from shallow wells unprotected streams or canal contamination is general. Such supplies are used indiscriminately for all purposes—for the watering of animals the washing of clothes and for drinking and although fortunately tea made with boiling (and therefore sterile) water is a

common drink enough water is taken in the raw state to afford some part of the explanation of the heavy incidence of cholera typhoid and dysentery

INTESTINAL DISEASES

Cholera—Cholera has appeared in epidemic form in Indo China many times since the beginning of the century but French medical writers claim that it has usually been introduced from other countries and that it is not merely a question of an endemic disease flaring up periodically to epidemic proportion Thus in 1926 cholera was introduced from India by way of Siam and produced the great epidemic which affected the whole of the Far East In 1937 the influx of refugees from China was responsible for another serious outbreak during which 12 715 cases were recognised and 9 246 deaths occurred This epidemic first affected Tonking causing outbreaks in Hanoi Haiphong and almost 2 000 small villages Thence it spread to Annam and in both these territories was characterized by the wideness of its spread rather than the intensity of its incidence in any one area In this epidemic Cochinchina and Cambodia escaped though in 1926 the latter territory had been heavily infected From Cambodia cholera has spread up the valley of the Mekong from time to time and medical writers have pointed out that contamination of rural water supplies has probably played an important part in the spread of the disease In Indo China human excreta are largely used as a fertilizer and the danger of contamination of vegetables by this means is evident This custom is important in that it indicates that the natives do not understand the danger of acquiring disease through contact with faeces which is axiomatic in the civilized races The handling of faeces in this way is undoubtedly of great importance in the spread of cholera typhoid and dysentery as it has been proved to be in China

Cholera is largely spread through contamination of water supplies and it is noted that in 1926 only the parts of Saigon which are not served with the main piped water supply were affected In Cambodia in 1912 there was a drought which caused famine This not only created a refugee movement but reduced the available water supplies the small wells were heavily used and soon became grossly contaminated with the result that cholera spread rapidly

In the face of epidemics sanitary measures are taken as they are possible but the problem is one of great difficulty The French authorities have relied largely on enormous campaigns of anti cholera inoculation and the majority of writers report favourably on this measure though some are not so enthusiastic Adequate control however can only be achieved by the slow process of control of water supplies and the education of the inhabitants in sanitation and personal cleanliness

The typhoid group of fevers—Of these true typhoid is the most common and a considerable number of cases are reported each year from all parts in 1937 there were records of 1 279 cases In Cochinchina it is seen especially in Saigon and the provinces of Gia Dinh Centre Soc Trang and Mytho and is usually of a rather benign type In Tonking the incidence appears to be rising It is said that cases occur in Europeans through the consumption of oyster and in natives from the eating of vegetables grown near Hanoi in fields fertilized with manure of human faeces Typhoid fever in Britain is usually a water borne or milk borne disease and tends to occur in epidemics no doubt

the same mode of spread takes place in Indo-China though definite reports to that effect have not been seen but spread through the eating of contaminated vegetables is easy to understand.

Dysentery—Cases of amoebic dysentery have been reported for many years in large numbers but the numbers confirmed by laboratory examination are but a fraction of those diagnosed on clinical grounds. In 1937 the figures were—Cochin China 34 667 Cambodia 19 866 Annam 20 523 Tonkin 9 633 Laos 6 159. These figures are very high and it may be that diagnosis is not always accurate. It is noted that diarrhoea—a known sequela of amoebic dysentery—is becoming more rare possibly because specific treatment of the dysentery with emetine is becoming more common. Amoebic dysentery is common in the Tonkin delta but much more rare in the mountains.

Bacillary dysentery is reported in considerable numbers in Tonking but there can be little doubt that many cases are not diagnosed. This disease is usually responsible for a high proportion of infant deaths in the tropics.

These diseases are spread by the contamination of food and water with human faecal material either directly or through the medium of house flies. The remarks on the spread of typhoid apply equally to the dysenteries.

OTHER DISEASES

Helminthic diseases—In Indo-China the distribution of hookworm infection is uneven. In Tonking and North and Central Annam the proportion of the population infected varies from 50 to 68 per cent. In these parts the dry season is relatively short and the long duration of the wet season and the corresponding persistence of moisture in the soil are favourable to the embryos. In Cochin China the rate is 15 to 25 per cent in South Annam 20 in Laos 29 in Cambodia (when the ground dries thoroughly in the dry season) 17 and in parts of North Annam where there are salt marshes (inimical to the embryos) not more than 7 per cent. These figures represent the amount of infection discovered—they do not represent the amount of disease since light infection is compatible with good health.

Infection with *Strongyloides* is found in Tonking and 318 cases were reported during 1937. This infection though not nearly so important as hookworm should be borne in mind since it appears to be unusually prevalent. It is generally an infection of dogs and cats but in Tonking for some reason as yet not clear it is apparently rare in these animals.

Of the other worm infection that with the common round worm *Ascaris lumbricoides* is the most frequent but is rarely a serious condition. The oriental liver fluke *Clonorchis sinensis* is found in the lower parts of Tonking and Annam. This infection is acquired by the eating of raw or undercooked fresh water fish in which the embryos are encysted.

Filariasis and its sequel elephantiasis are found. The mosquito carriers of these infections have not been fully reported for Indo-China but *Anopheles minimus* and *A. jaykotiensis* are mentioned. Doubtless species of *Culex* and *Mansonia* are mainly responsible.

Schistosomiasis has been reported in a few cases but with reservations.

Spiroseriasis an infection of man due to an embryonic cestode is not uncommon in Indo-China. The embryo is normally a parasite of

frogs and is acquired by man as a result of the native custom of applying split frogs or compresses made with frog tissue to inflamed spots more particularly the eye. The custom is evidence of the influence of Chinese medicine. The reasoning underlying the procedure is interesting —inflammation produces a heat the frog is cold blooded therefore frog tissue will remove inflammation. Or alternatively inflammation of the eye is due to worms the frog eats worms therefore frogs applied to the eye will remove the inflammation. Unfortunately in actual fact the sparganum is introduced in the process. The secretions of the Malayan bullfrog *Rhombophryne pulchra* are reputed to be good for silk worm bites but in reporting this view the French author JOYEUX asks sceptically whether a silk worm has ever been known to bite.

Leprosy is well known in Indo-China. In 1937 some 5 000 cases were known to exist but it was estimated that the full total was probably about 15 000. This is not a particularly heavy incidence rate in comparison with the figures reported from Burma India and Central Africa but it is enough to constitute a problem for the health authorities. There are special institutions for leprosy at Hanoi Bac Ninh and Thai Binh in Tonking as well as 4 leprosy villages which are conducted under native administrations of their own. In Annam there are institutions at Than Hoa Kontum Djiring and Qui Hoa in Cochin China at Choquan and Culao Rong in Cambodia at Treong. There are facilities for isolation in Laos and in Kwang Chow W in there is one institution.

Tropical phagedenic ulcer —The cause of this condition is not definitely known. It is common in labourers and appears to start from small abrasions or wounds of the legs and may lead to great destruction of the tissues. During 1937 there were 121 543 cases chiefly from central Annam.

Yaws is widespread and has been noted particularly in the Indo Malay races of Cambodia Laos western Cochin China and the Annam coast. In Cambodia the incidence is especially high in Kompong Thom Benglovea and Battambang. In Cochin China there are endemic centres at Giadinh Thudaumot and Chaudoc. In the whole of Indo China 97 442 cases were reported during 1937. It is stated that 70 per cent of infants are affected and that 45 per cent of adults show late signs of the disease and that as so often in the tropics the natives regard it as inevitable.

Veneral Diseases —Of these syphilis is perhaps the most important. 86 093 cases were reported in 1937 of which more than half were found in Annam.

In Saigon 60 per cent in Hanoi 35 per cent and in rural districts near Saigon 20 per cent of samples of the population have been found to give positive results to blood tests for syphilis but these figures are probably vitiated by the fact that in yaws the same result is obtained with the test. It is noted however in spite of the undoubted prevalence of syphilis that signs of congenital syphilis in schoolchildren are rare. The reason for this rarity of congenital disease is believed to lie in the fact that most of the syphilitic children fail to survive since congenital syphilis is not uncommonly seen in the newborn in maternity homes.

There are in Indo China a number of institutions for the treatment of syphilis and it is part of the duties of the staffs of travelling and fixed dispensaries and of hospitals to give treatment throughout the country. Surveillance of prostitutes is attempted.

Gonorrhoea is probably more widespread than syphilis. In 1937 there were 70 000 known cases but those undetected probably numbered far more. In Siam almost all the prostitutes examined were infected. This disease is a major problem.

Soft sore accounted for about 15 000 cases in 1937 and *lymphogranuloma inguinale* for about 2 300 being found in many instances along with other venereal diseases.

Tuberculosis—This disease is far more widely spread in tropical countries than in many temperate land where it is better recognized. It is not yet sufficiently realized that tuberculosis is not only a particularly fatal disease in natives of tropical countries but also that the proportion of the peoples suffering from the disease in many cases greatly exceed that found in Europe and North America. In Indo-China it is a problem which has been fully realized by the French and the extent of the problem is indicated by the fact that during 1935 35 014 cases and during 1937 48 120 cases were reported. It is not clear however whether these represent new cases or include some which had been diagnosed and recorded in previous years. Even should these not all be new cases however there can be little doubt that as the figures stand they understate the position since even in Europe

here the proportion of doctors to population is high there still cannot be said to be a fully efficient service of diagnosis of a disease one of the characteristics of which is its insidious onset. In a country like Indo-China the proportion of doctors to population is much less and it is not possible that all cases of tuberculosis are recognized.

As in other countries tuberculosis is more prevalent in towns and cities than in rural districts and for this reason it is stated to be more common in adults of the wealthy or middle classes than in peasants. Malnutrition regarded as an important factor in the predisposition to tuberculosis but the French authorities recognize the fact that a more important influence is exercised by the overcrowding which occurs in the dark airless dwellings especially of the towns. In these eastern countries there is little tuberculous milk.

The heaviest incidence appears to be in Tonkin and Cochinchina but it is not certain that this is so since the high figures reported from these areas may be the result of the greater facilities for diagnosis which exist in Hanoi and Saigon than in many other places. The point is that where the facilities exist the cases are found.

To deal with tuberculosis the French have created special hospitals at Lalun Bonnaire Thudaumot Phulam Hanoi Saigon and Hue and have reserved pavilions or beds for the disease in many other hospitals. In Cochinchina there is a travelling dispensary with X-ray apparatus and in many parts there are fixed dispensaries. Preventive vaccination by means of BCG has been widely used.

Smallpox—As in most primitive communities smallpox is a major problem. It is constantly present in endemic form and has from time to time flared up as widespread epidemics either from the spread of existing foci or as a result of introduction from abroad. Considerable epidemics were reported from Cochinchina Tonkin Laos and Cambodia in 1917-1920 and in 1924-1925. The latter epidemic followed that which affected the whole of the Far East India China Japan and Siam in 1923. In 1937 there were 3 000 cases with 680 known deaths.

To cope with this disease the usual port health regulations in regard to immigrants are in force and vaccination is performed on a large

scale. In 1904 a vaccine institute for the preparation of lymph was created in Hanoi and now similar centres exist in Saigon Hue Vientiane and Xieng Khouang. Vaccination is performed by trained natives and millions of people are dealt with each year—in 1928 over 74 millions were vaccinated. This campaign is continuous.

Of the diseases which commonly occur in temperate climates *influenza* has been reported sometimes in epidemics. *Pneumonia* is important—it is common in the tropics not only during influenza outbreaks but also as a constant and fatal disease. In 1937 there were 6 936 reported cases and the fatality rate in hospital was 32.6 per cent. *Cerebrospinal meningitis* not uncommonly occurs in epidemic form in labour camps. In 1940 6 788 cases with 819 deaths were reported from Tonking where the disease became epidemic. *Diphtheria* is found especially in Cambodia where there were 123 cases in 1937. Schick tests in schools of Thanhhoa showed positive results in only about 4.4 per cent and in Dalat and Haut Donnai in 18–20 per cent of the children indicating a high level of immunity. The disease was not seen in Laos or Kwang Chow Wan in 1937. *Measles chickenpox* and *mumps* occur the two latter especially in Annam. *Whooping cough* is relatively common and a few cases of *scarlet fever* have been reported from Cochinchina. There was an outbreak of *infantile paralysis* in 1935 when 248 cases were reported. In 1937 there were only 12.

Trachoma is said to affect 5 million of the inhabitants of Indo China and to be particularly common among the poor. It is associated with childhood and in Pnom Penh 43 per cent of the schoolchildren are affected. In Cambodia there is a kapok industry and it is thought that the dust created may by producing irritation of the eyes predispose to trachoma. This however is mere supposition. In Annam the disease is very common and although in the majority of cases it is mild and chronic tending to spontaneous cure it may lead to trichiasis and entropion and to complications which eventually produce impairment of vision. These complications are seen in Kwang Chow Wan though actual trachoma is stated to be rare. It is probable that as a cause of blindness trachoma is less important than gonorrhoea nevertheless it presents a sufficiently serious problem and anti trachoma work forms a specific part of the duties of the rural health services. As the disease is associated with poverty the argument has been used that the standard of life must be raised before improvement is possible but trachoma is conveyed from man to man by direct contagion and it is probable that contagion due to the overcrowding and dirty habits of the people is more important than poverty *per se* in this disease.

Rabies of man and animals is found. In Tonking during 1937 there were 19 in Vientiane 3 and in Saigon 2 human deaths from this cause. 62 animals suffered from the disease. At the Pasteur institutes of Saigon and Hanoi and the laboratories at Hue Pnom Penh and Vientiane 5 663 treatments were given in that year.

Anthrax has been found in past years and was recorded as an epidemic in 1914. There is no recent information but it probably occurs in cattle and may be contracted by man by the eating of undercooked flesh of animals dead of the disease or by contact with the skins.

Tetanus was responsible for 286 cases in 1937 but is probably more common than this figure indicates. It is noted that tetanus of the newborn causes a high proportion of infant deaths—it is contracted

through contamination of the umbilical cord but the incidence is falling especially in Cochin China where trained midwives are working.

Alcoholism and drug addiction—Alcoholism is stated to be widespread in the towns and among the educated in certain unusually exhausting occupations in the rural district it is virtually non-existent. Of the 1600 cases reported in 1937 the majority were from Cambodia, Annam and Cochin China. The annual number of admissions to lunatic asylums due to alcoholism is very small. Rice spirit is in current use, it is taken in small quantities and as a rule only on ritual occasions or at family celebrations.

Opium addiction is rare in the vast bulk of the rural population. Opium smoking is habitual only among the Chinese, a proportion of the wealthy Annamites and those town dwellers who frequent the squalid dens. Opium addiction is not regarded as an important public health problem and the admissions to hospital on this account are low. There is of course a traffic in opium and smuggling takes place.

Cancer is not rare. The majority of the 2815 cases reported in 1937 were found in Cochin China, Annam and Tonkin. It is noted that in the majority of cases the external genitalia are involved and that only 5 per cent are growths of the alimentary tract.

Terrestrial animals—Several poisonous snakes are found in Indo-China of which the most important are the cobra *Naja naja*, the king cobra *Naja laonak*, the krait *Bungarus fasciatus* and *B. candidus*. These members of the cobra family are all dangerous, their venom having a powerful action on the nervous system. Of the viper family the daboia (*Daboia siamensis*), *Ancistrodon rhodostoma* and *Trimerisurus* *gauri* (the banana snake) are dangerous, having a powerful action on the tissues round the bite and on the blood. Other species are found but are more rare. Pythons are numerous and may attain enormous size up to 10 yards, these are never poisonous and are said not to attack man. Poisonous sea snakes are encountered.

Spiders and scorpions are common and their bites or stings may produce severe symptoms. Of the biting insects *Brachinus crepitans* is noted, it is said to discharge formalin gas with a loud noise and to attack man.

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SUMMARY OF RECENT ABSTRACTS *

IX LEPROSY

Epidemiology

In a course of lectures (now published) on leprosy in relation to public health COCHRAN (p 785) has laid stress on several generally accepted views on the importance of close and prolonged contact in the transmission of leprosy to children on the value of the derivatives of hydno carpus oil in treatment and of intramuscular foudadin for the acute lepra reaction He insists on the necessity for isolation of the most infective patients and advocates voluntary segregation for this purpose village isolation is being attempted in Madras in areas shown by surveys to be seriously affected

In the Annual Report of the Madras Provincial Council of BEIRA AUSTIN (p 397) once more emphasizes the overriding importance of house and family contact in the epidemiology of leprosy in children If the incidence in children is higher than that found in adults the disease is probably spreading

LOWE (p 317) remarks that in an institution in India at which infants are not separated from leper parents until after the age of 18 months there have been 25 instances of leprosy developing in such children when they attained ages from 3 to 10 years He therefore advocates separation as early as possible adoption from birth by relatives is a good solution Marriage of lepers of child producing age should be prohibited in leper institutions unless the male patient is sterilized

In Orissa leprosy is widespread especially in the humid coastal districts VEIGLIESE and RATH (p 546) report an incidence of 1.3 per cent in 226 122 persons examined Of these 31 per cent were lepromatous The authors advocate the institution of agricultural colonies for the isolation of lepers

In a series of reports on leprosy in the West Indies MUIR (pp 462-4) brings out several important points Leprosy surveys are needed since many undetected lepers exist who do not receive treatment and who are not under supervision Some of these patients are in an early stage of disease others are infective Follow up of contacts of lepers should be more widely practised this would lead to detection of new cases Leprosy should be borne in mind during routine examinations of schoolchildren and the education of medical officers in the signs of early disease and of the public regarding the curability of leprosy and its epidemiology should be undertaken more vigorously Treatment of early cases apart from cases which are incurable should be arranged and more modern methods instituted Certain leprosy ordinances should be relaxed so as to allow patients to receive treatment as out patients

McCoy (p 609) discusses leprosy in the United States where except in the States bordering the Gulf of Mexico the same tendency is evident for the disease to die out as has been observed in parts of Europe In Louisiana Florida and Texas however there is a strong tendency for the foci of infection to perpetuate themselves

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 v 40 References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed

Discussing the incidence of leprosy in Maranhao Brazil ROSSAS (p 150) record an incidence rate of 1.2 per 1 000 in one area rising to 5.7 in another. He notes that the factors leading to high incidence are lack of segregation of lepers poverty and poor nutrition.

DANTAS (p 91) contributes a paper on leprosy in the State of Paraíba Brazil.

In *Leprosy in India* (p 701) an editorial comment rejects the view that the consumption of colocasia (taro) plays a part in the causation of leprosy and states that there is no valid reason why the production of this article of diet should not be encouraged. The theory originally advanced by OBERDORFFER that the incidence of leprosy is related to the predisposing effect of a diet rich in articles (such as yams in warm climates or corncockle in Europe) which contain sapotoxin is accepted by GEHR and GEHR (pp 59-60). It is suggested that the sapotoxins act by disturbing the endocrine functions of the body and it is on the basis of this theory that the treatment of leprosy with diphtheria toxoid was conceived the supposition being that adrenal insufficiency predisposes to infection by leprosy [see this *Bulletin* 1941 38 6]. These authors have studied the distribution of the disease in the Balkan countries and in Spain. There is high incidence in Crete and other Grecian islands and in these places the consumption of sapotoxin-containing foods is said to be high. The predisposing factors regarded as important by most leprologists are more or less dismissed in favour of this sapotoxin factor. In Spain leprosy is most prevalent in the southern and Mediterranean provinces and in Portugal around Coimbra.

DENECKE (p 149) has studied leprosy in the Spanish West African colony of Rio Muni where it is widespread in the most hot forested area and in the island of Fernando Po. His investigations do not support any idea of hereditary transmission and he inclines to the view that the common method of infection is through wound. He does not subscribe to the sapotoxin theory but thinks that a generally poor diet deficient in animal protein is a predisposing factor. Leprosy in the wives of lepers seems to affect adversely the birth rate but child mortality is as high in the children of healthy as of leprous wives of lepers.

MUNOZ RIVAS (p 151) has examined the stomach contents of fleas which had fed on lepers and has found acid fast bacilli in a large proportion of them. This investigation was part of an enquiry into possible insect transmission of the disease in which fleas were elected because of their ubiquity and habits. Other arthropods are also discussed but are not considered important. The author makes no claim that fleas do in fact transmit leprosy. He merely records his preliminary findings. [LAMBORN (this *Bulletin* 1935 32 909 1937 34 610) has also investigated this arthropod transmission of leprosy.]

Etiology Pathology Lepromin Tests

DUBOIS and GAVRILOV (p 150) have failed in an attempt to infect 16 hamsters with material from human leprosy. One animal developed lesions containing acid fast bacilli but these proved to be rat leprosy bacilli. The authors cannot yet offer an explanation of this but are in estimating the matter further.

COCHRANE (p 151) describes the cellular reactions in the various forms of leprosy. These are strong in the neural forms and are illustrated

by the tuberculoid and tissue reactions which lead to destruction of the bacilli. The absence of such reactions in lepromatous leprosy enables the organisms to multiply and spread. In nerve leprosy the tuberculoid cellular reaction may lead to the formation of abscesses within the nerve sheaths. These abscesses may damage the nerve fibres and lead to permanent destructive changes.

CASTAÑE DECOUD (p 547) describes a condition of para arterial neural infiltration in tuberculoid leprosy in which infiltration starts around the nerve fibres and displaces but does not invade the vascular structures. This condition is not found in non leprous granuloma.

MARTÍNEZ BÁEZ (p 922) describes the Lucio form of leprosy, a form originally investigated by Rafael Lucio in Mexico and since given little attention. In the dermis are masses of inflammatory cells around the blood vessels, the vessels are dilated and changes are present in their walls and in the endothelial cells of the capillaries. The endothelial cells contain leprosy bacilli. The cell aggregations consist of lymphoid elements and histiocytes and may undergo necrosis. The sweat glands may be involved.

SCHUJMAN and VACCARO (p 547) discuss glandular enlargement in leprosy. The order of frequency of enlargement in their series was axillary, inguinal, cervical and epitrochlear. The glands did not suppurate. They were largest and most numerous at the time of a leprosy reaction. Enlargement was present in 96 per cent of lepromatous and in 60 per cent of tuberculoid cases. There seems to be no relation between the severity of the skin lesions and enlargement of the glands draining the area.

GONZÁLEZ GUZMAN (p 787) has studied the lymphocytes in the blood of lepers. The picture does not appear to be very characteristic—most of his patients had a total of lymphocytes within the normal limits—but he states that there is a nucleolar deviation to the right [this connotes an increase in the number of lymphocytes having several nucleoli].

FITE (p 787) makes the point that tuberculoid leprosy represents the natural development of immunity to its highest point. The reactions of leprosy are allergic manifestations in which hyperergic inflammation makes apparent old lesions in the guise of new ones.

FERNÁNDEZ and OLMOS CASTRO (p 245) have studied the reactions of lepers and other persons to the intradermal injection of whole lepromin (a preparation which contains all the constituents of a leproma) and of lepromin filtrate (a preparation made from a leproma and then passed through a filter candle). Whole lepromin gives rise to an early reaction and a late reaction (Mitsuda). If the early reaction is positive the late reaction is also invariably positive but in some cases the late reaction may appear without having been preceded by an early reaction. The early reaction is never seen in lepromatous cases. Both reactions are frequently positive in neural leprosy and more frequently still in tuberculoid leprosy. In healthy persons the results are often divergent, the early reaction usually negative and the late reaction often positive. The lepromin filtrate produces the early but not the late reaction and the results are very similar to those of the early reaction with whole lepromin. This filtrate acts in much the same way as DHARMENDRA'S soluble proteins of *Mycobacterium leprae*.

DHARMENDRA (p 548) has prepared from lepromatous tissue a bacillary antigen from which tissue elements and lipoids have been very largely eliminated. The antigen consists almost entirely of bacilli.

and is found to retain its antigenic property. It can be standardized. With this anti on the early reactions are stronger and the late reactions considerably weaker than with ordinary lepromin. Most neural cases respond to this anti_{gen} and most lepromatous cases do not.

DHARMENDRA *et al* (p. 316) note a tendency for the lepromin reaction to vary somewhat according to whether the test is applied for the first or second time and according to the seasons of the year. Standardized lepromin shows little variation in activity. They (p. 317) cannot confirm the view that a negative test is converted to positive by repeated injections of lepromin.

DHARMENDRA and MUKHERJI (p. 701) have found that the activity of tubercloid neuro-macular leprosy undergoes exacerbation particularly in the first months of the hot dry season February to May. During the phase of activity the lepromin test shows strong reactions. Climatic conditions do not apparently explain the exacerbations nor does the consumption of colocasia the causation of these seasonal variations is therefore not clear.

Clinical Findings Treatment Prognosis

FAGET (p. 547) discusses the high incidence of pulmonary tuberculosis in leprosy in the leprosy sanatorium in Louisiana and at Culion. The finding of acid fast bacilli in sputum does not suffice for diagnosis since they may be leprosy bacilli from throat lesion. Animal inoculation must therefore be practised. X-ray examination of the chest is important for diagnosis of tuberculosis and it is noted that leprosy lesions of the lung tissue are rare and are too small to be detected by X-ray. Treatment for tuberculosis should be given in the usual way and active anti-leprosy treatment should be stopped. Prognosis as regards tuberculosis is fairly good. It is most important that the tuberculous patients should be isolated to prevent infection of others.

HIDALGO (p. 58) has recorded two cases. In the first a rash considered to be syphilitic turned out to be due to leprosy. In the second the reverse is the case.

DE OTTE (p. 331) describes an ingenious modification of the sweating test in neuroleprosy in which a permanent record of an anhydrotic area is made by applying transparent paper coated with 5 per cent silver nitrate in gelatin to the area after injection of pilocarpine chloride. In this case the reaction with silver nitrate to form silver chloride which turns black in the light. After treatment in a bath of paraffin the records can be kept for comparison with later records.

ALLEN (pp. 315-700) contributes reports on the Central Leprosy Hospital Makou in which he noted that intramuscular injections of iodized chaulmoogra oil and intradermal injections of ethyl esters remain the routine treatment. He remarks that a large proportion of very early cases are sent to Makou from the Cook Islands by a practitioner who was trained at Makou. A corollary is that it is among these patients that the highest proportion of arrested cases is achieved.

MONTEL (p. 759) reports apparent cure in three patients with neural leprosy and observed for several years after cessation of treatment. At the time of diagnosis the disease was progressive and the favourable course is attributed by the author to the use of a preparation of chaulmoogra.

Successful results in the treatment of a few cases with Caloncoba oil are reported by RANVA and LIMBOS (p. 316) but further experience

is necessary before a true appreciation can be made Caloncoba oil is rich in substances of the chaulmoogric acid series

A trial of sulphamylamide in leprosy has left TAGET *et al* (p 610) with the impression that although it is useful in secondary infections it has no value for the leprosy itself

Investigating the effect of sulphamylamide and sulphathiazole on rats and mice infected with a virulent mouse strain of leprosy bacilli KRAKOWER *et al* (p 789) found that administration over a period of one year prevented the development of any but very small lepromata whereas in controls there were large lepromatous masses with ulceration and metastases If treatment was continued for 5-7 months only the animals developed more extensive lesions but still not so great as those of the controls the same was true of animals in which treatment was not commenced for 5 months after infection Bacilli from the treated animals were shown to be of unimpaired virulence and were not sulphonamide fast There was no evidence that the bacilli were killed by the treatment only that there was retardation of their effects

IGNACIO CHALA (p 248) has used an antimonial Stibicel with some appearance of success in the treatment of three patients with tuberculoid or macular leprosy

REENSTIERNA (p 152) by injecting into sheep a strain of acid fast bacillus isolated from a case of human leprosy and regarded by him as the cause of leprosy (though possessing the characters of the rat leprosy bacillus) has produced a serum which has been tried in the treatment of leprosy in many countries and by many workers He has published an account of the results achieved and his conclusions may be summed up in the statement that in nerve leprosy rapid amelioration of sensory and paralytic symptoms healing of ulcers (alone) and occasional improvement of macules often follow the treatment There is as yet not enough evidence to indicate the duration of these results but the author claims that the serum may be of some value as an adjuvant to other forms of therapy

GRASSET and DIVISON (p 611) have prepared an antigen from a non acid fast bovine strain of *Mycobacterium tuberculosis* which they have used in the treatment of tuberculosis and which they have now tried in leprosy It is not useful in lepromatous cases but seems to have a value in nerve leprosy if used in conjunction with hydriocarpus esters The majority of the patients with nerve lesions became bacteriologically negative whereas in a comparable number of controls this did not occur

TRANT (p 154) has tried diphtheria antitoxin in early leprosy and considers that the effects on local lesions were moderately encouraging In maculo anaesthetic cases the results were more disappointing

HAYTHORNTHWAIT (p 702) has found that injections of lactoflavine four or five times in the course of a year have prevented the formation of bullae (which lead to painful ulcers) in a number of cases and that it is very effective in the treatment of bullae when formed The condition is not associated with other signs of vitamin B₂ deficiency A light plaster support affords great relief in cases of perforating ulcer of the foot without bone disease

PERLES (p 155) has infiltrated with 2 per cent novocaine the inferior cervical or stellate ganglion of the sympathetic in the treatment of nerve lesions of the arm The results include recovery of the functions of the fingers absorption of oedema and healing of ulcers

The method is based upon the proved value of such treatment in trophic and sympathetic lesions in general.

In a discussion of the prognosis of leprosy COCHRANE (p 151) points out that there is a strong tendency for the mildest nerve forms to recover spontaneously. Improvement without treatment occurred in 53.1 per cent of patients with macular tuberculoid or incipient childhood lesions, it was 3.5 times as frequent in patients with positive lepromin reaction as in negative cases. Neural leprosy rarely became prominent.

MAYILING (p. 465) give an account of the condition of lepers released from Culion and the provincial centres in the Philippines between 1922 and 1938. This cannot further be abstracted but consider the advanced condition of so many of the Culion cases the results here recorded are encouraging.

Classification

PARDO CASTELLO and LIANT (p. 785) have devised a classification of leprosy in which not only the clinical manifestations but also the pathology, immunology and bacteriology are taken into account. No adequate description of this classification can be given in a short space and readers are advised to seek the details in the original abstract.

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RABIES

A REVIEW OF RECENT ARTICLES 511

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REMLINGER and BAILLY¹ discuss further their theory that proteolysis is responsible for the inactivation of the fixed virus of rabies under certain conditions of desiccation. In previous papers [this *Bulletin* 1940 v. 37 615 1943 v. 40 195] they stressed the fact that the virus, contrary to previous belief, will remain infective for long periods after rapid desiccation at -10°C . On the other hand during the process of slow desiccation over caustic potash as carried out in the preparation of Pasteur's vaccine there is complete loss of infectivity of the virus in a few days. They maintained that this loss of infectivity was probably due to the action of cellular proteolytic ferments or enzymes similar to those responsible for the maturation of meat and the destruction of carcasses. In support of this hypothesis they submit in the present paper the result of an experiment in which a 1:100 suspension of the brain substance of mice dead after infection with fixed rabies virus was filtered through filter paper and then mixed with varying concentrations of ascorbic acid. The mixtures of virus and ascorbic acid and control suspensions of virus without ascorbic acid the hydrogen ion concentration of both having been adjusted to 6.8 were kept in the dark at a temperature of 21°C to 24°C in the absence of

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oxygen (such reduction as was effected resulted from allowing a candle to burn in an hermetically sealed incubator in which the tubes were placed) Care was taken to exclude any copper ions from the fluid in which the suspensions were made It is stated that under similar conditions it has been shown by other investigators that ascorbic acid will inhibit certain proteolytic ferments such as poly peptidases The results obtained by the present authors pointed to a longer survival of the virus in the mixtures containing ascorbic acid up to 1:1 000 than in the mixtures containing ascorbic acid in 1:5 000 or greater dilutions or in the suspensions without ascorbic acid They conclude that this could be explained by the probable inhibitory action on the proteolytic ferments They are aware that AMATO [this *Bulletin* 1938 v 35 653] reported that in controlled experiments ascorbic acid destroys the fixed virus of rabies *in vitro* However they maintain that he did not ensure those conditions referred to above which would serve to obviate the production of hydrogen peroxide as a result of the oxidation of ascorbic acid and that FERMI has shown that hydrogen peroxide will inactivate the fixed virus of rabies

While their hypothesis and their conclusions that Pasteur in making his vaccine employed the ideal condition to secure diastatic attenuation of the virus before desiccation destroyed the ferments may be correct it would appear that the problem requires further investigation and the results may be open to other and simpler interpretations It may here be recalled that REMINGER & BAILEY (this *Bulletin* 1940 v 37 615) recorded that whereas the viruses of rabies and Aujeszky's disease would both survive for long periods after being dried rapidly they behaved dissimilarly to the action of slow desiccation over KOH The virus of Aujeszky's disease was 50 times more resistant to the latter than the fixed virus of rabie The explanation of these observations solely in terms of the action of proteolytic ferments would not appear to be fully justified]

KUBES and GALLIA² describe a brain tissue neutralization test to demonstrate the neutralizing power *in vitro* on rabies virus of the brain tissue of mice treated with anti rabies vaccines and compare the results with those obtained in protection and serum neutralization tests Their main general conclusion is that the results given by the brain tissue neutralization test *in vitro* are closely paralleled by those of the protection test *in vivo* and seem to be equally exact and sensitive Further because of its greater specificity (presumably as compared with the serum neutralization test) and very simple technique it appears to be a laboratory method of practical usefulness for the evaluation of the antigenic power of anti rabies vaccines as well as for the immunological differentiation of heterologous rabies viruses It would appear nevertheless from their results that it has no advantage either in simplicity of technique or economy of mice used over the protection test

Their methods and materials were as follows —Swiss white mice 4 weeks old were immunized according to WEBSTER'S method [this *Bulletin* 1940 v 37 p 194] i.e. 6 intraperitoneal injections of 0.25 cc. of the vaccine under test were given and in one case 6 doses of 0.02 cc. of the vaccine were injected intracerebrally Light different

² KUBES V & GALLIA F Brain Tissue Neutralization A New Biological Reaction for Rabies Virus Its relation to the Protection and Serum Neutralization Tests *Canadian J Comp Med* Gardenvale Quebec 1944 Feb v 8 No 2 48-60 [10 ref]

vaccines were used and these consisted of 50 per cent suspensions of bovine brain tissue in 1 per cent carbolic acid diluted 1:9 before use. Attenuation of vaccines was effected by storage in the cold for some weeks or incubation at 37 C. and inactivation by incubation at 37 C. 56 C. or as in one instance where there was no carbolic acid in the vaccine the virus was neutralized by the addition of an immune serum. Seven of the vaccines were prepared from a native fixed strain of bovine paralytic rabies, Bolivar strain and one from a Pasteur fixed virus strain. The brain tissue from which the vaccine was made was thoroughly homogenized by passing it first through a Latapie mincer and then through a colloidal mill. With each vaccine 25 mice were immunized and 14 days after the first injection the protection test according to the method of HABEL [this *Bulletin* 1941 v. 38 161] was carried out on 20 mice. The remaining 5 mice were bled to death according to KUBLY'S method [from the axillary artery] (see *Immunity Science* 1941 93 504). Their sera were used in the serum neutralization test and the brains in the brain tissue neutralization tests mentioned. The cross immunity tests between the Bolivar and the Pasteur strain were carried out on groups of 50 mice. For serum neutralization test the serum was used undiluted or diluted 10^{-2} and 10^{-3} . The virus containing mouse brain tissue was used diluted 10^{-2} or 10^{-3} the diluent always being saline. The different serum dilutions were mixed with the two dilutions of virus in equal proportions 0.5 cc. of each and the mixtures remained at room temperature for 18 hours. 0.03 cc. of each mixture was then injected intracerebrally into mice. Control mixtures consisted of serum of normal mice with similar dilutions of virus in equal proportions.

The brain tissue neutralization test was similar in general lines to the serum neutralization test. Mouse brain tissue from immunized mice was suspended in saline to give a dilution of 1:3 and mixed with 0.5 cc. of serial dilutions of virus. To each tube 2 drops of fresh rabbit serum were added. As a control a suspension of normal mouse brain tissue was used.

Five experiments were made and since many conclusions are drawn by the authors from these few experiments it may be useful to summarize their results in the form of a simplified table (below) which in the reviewer's opinion (and it is hoped in that of the authors also) represents with some degree of accuracy their observations.

They have reported on the results of their experiments as follows —

Experiment 1 — Both vaccines containing active virus had a high degree of immunizing power. The serum antibodies were of high titre in both groups of mice. The brain tissue neutralization test showed likewise a high titre of antibodies in the brain tissue of both groups of mice but lower than in the serum.

Experiment 2 — Vaccines (non infective by I.C. test) with a high protection power elicited also the formation of rabies antibodies in the brain. However their antibody formation power was a little lower than the similar power shown by antirabies vaccines with an active virus content. The serum neutralization test did not show any reduction of the serum antibody formation power of these vaccines compared with the intensity of antibody formation seen in Exp. 1.

Experiment 3 — Considering the results of experiments 1 and 2 in conjunction with experiment 3 it is clear that the number of minimal lethal doses (m.l.d.) withstood by immunized mice *in vivo* is always

Table summarizing KUBFS and GALLIAS Experiments

Exp 1 (6 I P injections 0.5 cc)	Exp 2 (6 I P injections 0.5 cc)	Exp 3 (6 I P injections 0.25 cc)	Exp 4 (6 I P injections 0.25 cc)	Exp 5 (6 I C injections 0.02 cc)
Vacc 1 (Active virus killed 100 per cent mice I C)	Vacc 3 (Non infective I C test in mice)	Vacc 6 (Non infective I C test in mice)	Cross immunity tests	Vacc 3 and Vacc 4 (see Exp 2)
Set red 5 weeks in cold room	Incubated 3 days at 37 C	Stored in cold 18 months	Pasteur Strain X Bolivar Strain	
P ++++	P ++++	P 0	P immunological difference indicated	P ++
BN ++++	BN ++++	BN 0	BN immunological difference indicated	BN ±
SN ++++	SN ++++	SN ++		SN 0
Vacc 2 (Active virus killed 50 per cent mice I C)	Vacc 4 (Non infective I C test in mice)	Vacc 7 (Non infective I C test in mice)		
Incubated 4 hours at 37 C	Incubated 7 days at 37 C	Virus neutralized by immune serum	SN no indication of immunological difference	
P ++++	P ++++	P 0		
BN ++++	BN ++++	BN 0		
SN ++++	SN ++++	SN 0		
	Vacc 5 (Non infective I C test in mice)			
	Incubated 1 hour at 56 C			
	P ++++			
	BN +++			
	SN ++++			

SN = serum neutralization test
BN = brain neutralization test
P = protection test
I C = intracerebral injection

much higher than the number of m.i.d. neutralized by the respective suspensions of brain tissue *in vitro*. Nevertheless there is an actual parallelism between immunity and brain tissue neutralization. The results of the serum neutralization tests are different: they were positive even when the other two tests gave negative results.

This fact gives some basis to the supposition of a different character or origin of rabic antibodies present in the serum and those found in brain tissue.

Experiment 4—The results of this experiment showed that the brain neutralization test gave the same result as the protection test. On the other hand the serum neutralization test did not show an immunological differentiation. From this fact one may assume that it is due to the different origin of the tissue and serum antibodies and to the greater specificity of the first ones.

Experiment 5—Repeated intracerebral injection of killed antirabies vaccine gave a certain degree of immunity to mice. The neutralization power of the brain tissue of these animals *in proportion* to the ether extract is greater than that of the serum was greater than when the same vaccine was intraperitoneally injected [Exp. 2]. We suppose that this is due to the influence of the direct stimulation of brain tissue leading to the local production of cerebral antibodies nearly independent of the antibodies of humoral origin.

These observations have been quoted in some detail since the authors are obviously raising again the vexed question of a tissue as distinct from a humoral immunity for they state that there is no doubt left that these results agree completely with the criteria of Centanni, Lepine *et al*. These authors believe that the virus destructive power of immune serum is not the main support of antirabies immunity *in vivo*. [What LÉPINE says (and the view has been advanced and upheld by others) in his article on rabies in *Les ultravirus des maladies humaines* (LEVADITI C. and LÉPINE P. Librairie Maloine Paris p. 488).]—There is no parallel between the serum antibodies which arise in the reticulo-endothelial system and the state of immunity inherent in the tissue defence of the cerebro-spinal axis. In rabies as in the case of other neurotropic viruses the immunity is of a cellular order and not of a humoral order. It is possible that the rabicidal antibodies play a rôle of completion in the defence of the organism; nevertheless they are only an *explanant* in the establishment of immunity which does not require their presence to manifest itself and which persists long after their disappearance.

The present authors state also that the different sensitivity between the serum neutralization test and the brain tissue neutralization test possibly is the best evidence at hand that in the organism besides the humoral antibodies there are other antibodies in the brain tissue which have a greater specificity. If the brain antibodies were a mere local reflex of the serum antibodies it is not likely that the brain tissue neutralization test could be of a greater specificity and reveal an immunological difference between two heterologous viruses which the serum neutralization test did not show.

They express the opinion also that the possibility of demonstrating a tissue immunity independent of a humoral one may be governed by the greater affinity of a virus for a given tissue [cf. results of other in *in vitro* tests in equine encephalomyelitis virus (American) in which the specific affinity is not so great]. Further a fact remains to be explained. Constantly the number of m.i.d. neutralized by brain tissue was

lower than the amount of mld s neutralized by the serum — possibly cerebral antibodies exist within the cells and their neutralizing power is closely dependent on the cellular metabolism. Therefore their action *in vitro* can be only a fraction of their possible full neutralization power in a living organism. The higher specificity of tissue antibodies may be also explained by the just mentioned nature of the cerebral antibodies. Such an explanation must not overlook the possibility of this greater specificity as being the result of a special and more specific antigen differing from the antigen arousing the formation of humoral antibodies.

[There is no space here to comment fully on their results and general conclusions. It is felt however that the experiments are unfortunately too limited for reliable deductions to be drawn but it is possible that further observations may help to substantiate their contentions.]

Attention should be drawn to the following facts — in Experiment 5 although they have not stressed the point the amount of antigen injected intracerebrally was about one-tenth of that injected intraperitoneally in Experiment 2. It may be due to this that the immunity response was very much less in the first case than in the second. In Experiment 5 the difference between the brain tissue neutralization test and the serum neutralization test is not very great both indicate a lower grade immunity as does the protection test than that observed in Experiment 2. There would appear to be no clear evidence that the neutralizing substances detected in the brain tissue were produced locally as suggested. In the field of immunology there is some evidence that antibodies may be formed not only in the reticulo endothelial system generally but also in lymph glands. It must be remembered also that when an inoculum is given intracerebrally there is damage to the haemato encephalic barrier and antibodies produced elsewhere may be mobilized at the site where some reaction is taking place. In Experiment 4 the results of the cross immunity tests do not confirm the observations made in the previous paper by the authors (this *Bulletin* 1943 v. 40 208) that a vaccine prepared from the fixed native virus of paralytic rabies (Bolivar strain) protects against the Pasteur strain of fixed virus whereas a vaccine made from Pasteur fixed virus does not protect against a Bolivar virus. In the present experiment the vaccine prepared from either strain did not appear to show much protection against the other. It is noteworthy also that in Experiment 4 the serum neutralization test did not differentiate immunologically between the two strains of virus whereas in their previous paper (*loc cit*) it did so. The only difference was that the serum on the previous occasion was obtained from mice which had survived the protection test and had therefore received an intracerebral inoculation of active virus after immunization whereas in the present instance the serum was collected from mice which had received a course of vaccine only.

The immunological difference which appears to exist between the Bolivar strain of virus recovered from cases of paralytic rabies in bovines and the Pasteur or other strains of rabies virus recovered from canines awaits confirmation. If as the authors have tentatively suggested the degree of fixation or number of passages in the experimental animal may influence the result of such differentiation this is a factor which would have to be taken into account. In their previous paper (*loc cit*) they have stated that the discrepancies between the present findings and those of preceding workers which did not disclose any biological difference between the canine rabies virus and the paralytic rabies

virus [see e. HURST and PAVAN (this Bulletin 1932 v. 29 p. 595) and MIGNONE and PENNA *Bull Soc Path Exot* 1932 v. 27 p. 590 also GALLO and ITCHE *Rev Med Vet Parasit* Caracas 1939 v. 1 p. 91 referring to paralytic rabies in Venezuela] are explained in the writers' opinion by the dissimilarity of the methods made use of.

It is not therefore our intention to suggest more than that the present author's statements should be treated with an open mind. They have recorded observations suggesting that there may be immunological difference (quite apart from immunogenic differences) between strains of the virus of rabies and suggesting the existence of a tissue as distinct from a humoral immunity—a conception which may go counter to current immunological thought. Such stimuli are not to be deprecated simply because they may cause a flutter in the dovecote of the humoralists. However it would appear that a great deal more experimental evidence is necessary to establish the validity of their conclusion. That there is a lack of parallelism especially in certain diseases such as poliomyelitis, rabies, Borna disease and foot and mouth disease etc. between the existence of demonstrable circulating antibodies and the degree of resistance to infection by contact exposure or inoculation does not appear to be in doubt. That such resistance can be exhibited long after antibodies can no longer be demonstrated in the circulation is apparent but this lack of correspondence is subject to different interpretations and up to the present no explanation which has been submitted appears to be entirely satisfactory.]

11. Symptoms and Disease 1055

MOH IN ALI ABBASI³ reports that a young man of 35 was bitten on the right ear by a wild mongoose. The victim showed symptoms 57 days later. He reported that there had been some pain around the scar at the site of the wound for a period of two days previously. The patient was restless and had a look of anxiety and on being presented with water exhibited typical symptoms of hydrophobia. The following day the condition was worse the patient was drenched with perspiration and there was considerable salivation. Death ensued a few hours later the patient being unable to swallow during the final stages. No post mortem diagnosis was made but there appears to be no reason to doubt that the disease was rabies in view of the history, symptoms and information that the same mongoose bit a cow on the nose on the same day as it attacked the man and the cow died of rabies 12 days before the man. The author believes that this is the first case of a mongoose bite causing rabies. [While this may or may not be true for India it has of course been known in S. Africa since 1929 that the genet or meerkat (*Genetta felina*) and the mongoose (*Cynictis pericillata*) (also known as the yellow mongoose, yellow meerkat or red meerkat) may carry the virus of rabies and infect man and sometimes cattle by their bites (DU TOIT *Proc African Assoc and Vet Conference* Pretoria 1929 77-284).]

PHILLIPS⁴ records the history of a case of hydrophobia which followed an attack by a rabid jackal during which five deep bites were inflicted on the head of the victim. The patient had undergone a full intensive

W	AL A	W	W	mongoose B t	d Hydr ph bia	I d n M d Gar
1943	N	78	N	11 550		
PHILLIPS	J W	Hydrophobia	ft	Anti Rab	Treatm t	J I d Med
A	1943 Oct	13	N	1 6		

course of vaccine treatment for 14 days and the first symptoms were observed 6 days after completion of this treatment. There was a history of premonitory symptoms during a period of 36 hours before the patient reported sick of insomnia, headache and vomiting of a coffee coloured vomit. Incomplete paralysis of the lower limbs set in, spasms of the muscles of deglutition and at times a sort of maniacal fury. Death ensued in two hours. The author is of the opinion that in cases of head bites even although they may involve the face and neck in view of the close proximity to the brain and large nerve trunks cauterization should be carried out in addition to vaccine therapy.

III Methods of Treatment and Statistics

KAISER⁵ believes that it should be possible to improve the method of preparation of anti rabies vaccine. His remarks are somewhat diffuse as is his description of the method which he suggests. His main contention is that the essential part of the process is to get rid of the lipid portion the Ballaststoffe or non specific carrier substance of the nervous tissue by extraction with ether thus making the material hydrophile or more correctly lyophilic. As far as can be gathered the brain and cord material are first dried at low temperature after thorough grinding of the minced tissue in a ball mill for 12 hours and subsequent centrifugation for 30 minutes at 3 800 revs per minute (see KAISER *Arch Virusforsch* 1939 v 1 85). The material is treated with ether in a shaker and then the ether is removed. Sometimes the deposit which constitutes the vaccine is still infective and it has to be treated with iodine vapour by the method previously described by the author (*Arch Virusforsch* 1939 v 1 237). That the vaccine is non infective is controlled by the intracerebral inoculation of rabbits. The vaccine is in the dried state and is therefore compact and the risk of bacterial contamination is avoided. It can be distributed in phials containing one dose which can be easily dissolved in the prescribed quantity of physiological saline. This method of preparation of the vaccine facilitates decentralization of the rabies service. The vaccine contains no carbolic acid and it is free also of admixture with anything superfluous. [There are many different methods of preparing rabies vaccines and until recently there was no reliable test available to gauge the potency of these. Now however there is a considerable amount of evidence that a mouse potency test such as that elaborated from other methods by HABEL [this *Bulletin* 1941 v 38 161] gives a good indication of the probable efficacy of a rabies vaccine in protecting other animals e.g. dogs and it would be useful if tests of this sort were carried out on all vaccines for human application. It would be especially so when some new method of vaccine production is introduced as in the present instance which deviates somewhat from methods in more common use.]

BÉQUIGNON and VIALA⁶ report that during the year 1942 435 people presented themselves for treatment with vaccine at the Pasteur Institute Paris and that in 149 of these such treatment was considered necessary. Forty seven had been bitten by dogs (in 8 instances the

⁵ KAISER M. Ist es möglich die technische Herstellung von Lyssaimpfstoffen zu vervollkommen? *Wie i. d. Woch.* 1943 Aug 27 v 56 No 33/34 507/8.

⁶ BÉQUIGNON R & VIALA C. Les vaccinations antirabiques à l'Institut Pasteur en 1942. *Ann Inst Pasteur* 1943 Nov-Dec v 69 No 11-12 372-4.

dogs were strays 26 by cats (in 9 instances by stray cats) and 6 by rats 143 patient belonged to Category C (i.e. the animal responsible for the bite was suspected of being infected with rabies) and one belonged to Category B (i.e. rabies had been diagnosed by the clinical picture in the biting animal). In 145 cases the bites were deep in 70 they were not through clothing. Eleven bites were about the head 74 were on the upper limbs 2 on the trunk and 6 on the lower limbs. There were no paralytic accidents as a result of the vaccine treatment and no deaths were recorded. In 100 cases treatment commenced within 4 days of the bites in 17 within 5-7 days in 21 within 8-14 days in 17 within 15-21 days in 4 more than 21 days had elapsed. A histological examination of the nervous system of the biting animal was carried out in 38 cases and this included a study of the plexiform ganglion. Since symptoms had not been observed and the histological findings were negative treatment was interrupted in five cases.

In the fortieth review of this series this *Bulletin* 1944 v. 41 pp. 167-181 the results recorded by SHAUGHNESSY and ZICHI in a paper on 'Prevention of Experimental Rabies' were discussed. The reviewer has received a letter and a corrected reprint from one of the authors pointing out that several errors had crept into the paper in addition to the one to which attention had been drawn in the review. However fortunately these were minor ones and did not materially affect their general conclusions with the exception of the latter. It is only fair therefore to quote their statement that sixty guinea pigs were employed as the untreated controls in the experiments in which the animals were treated 6 hours after they were inoculated with rabies. According to these figures 35 per cent of the control animals did not develop rabies as compared with the 63 per cent of those treated with Fum. Nitric Acid and 66.6 per cent of those treated with Soap Solution. In the original paper the number of controls which were recorded to have survived was 41/60 and the reviewer made a total 31/60 whereas it should have been 41/60. It is apparent therefore that treatment with Soap Solution or Nitric Acid had some definite but lesser effect even when carried out 6 hours after infection and the comment appearing in the review requires amendment.

1. Post Vaccinal Paralysis

STEINBERG and CRIVELLARI⁷ at a conference on endemo-epidemic diseases at Buenos Aires summarized the types of paralytic accidents accompanying or following upon vaccine treatment in rabies and made reference to the known theories as to their aetiology. They referred to the three better known types dorso-lumbar myelitis Landry's ascending paralysis and peripheral neuritis of the cranial nerves and to a fourth type described by Ford as disseminated encephalomyelitis. They gave the detailed history of 110 cases which they had observed and classified in the category of dorso-lumbar myelitis although the first of these they thought could be more correctly described as one of encephalo-meningo-myelitis. The patient had been bitten by a dog but it was not certain that it was rabid. Thirteen days after the course of vaccine treatment commenced there was general hyperreflexia emprosthotonus (couche en chên de fêl) some nervous and psychic

STEINBERG J. and CRIVELLARI C. A. A. d. tes post. nales a. tur
rab. cos. dos. casos. Pr. m. Congr. V. E. ferm. da. E. drmo-Ef. dlm
Buc. 4. 194. No. 9. 13. 469-71

changes Kernig's and Brudzinski's signs were positive later there was paralysis of the lower limbs and retention of urine requiring daily catheterization. The first symptoms were those of meningitis but when paralysis of the lower limbs set in treatment was suspended. There was no hydrophobia and this led to the belief that it was not a case of rabies and the subsequent evolution of the condition confirmed this opinion.

The second case occurred 13 days after treatment commenced there was nausea vomiting headache epigastric pain weakness of the lower limbs with difficulty in walking cutaneous hyperaesthesia at the sites of paralysis. The reflexes were exaggerated and Babinski's sign of the right foot was positive. The abdominal and cutaneous reflexes were diminished and the cremaster reflex abolished. There was retention of urine. There was almost complete recovery in about three weeks in both cases. The treatment which may be described as symptomatic included repose and administration of serum glucose camphorated oil vitamin B₁ and liver extract. In one case sulphanilamide was given. This was omitted in the other and leucotropin (a compound of methenamine and cinchophen stated to be for intravenous injection in inflammatory processes) was given. Since both patients recovered it is concluded that no specific action would be attributed to sulphanilamide.

Aujeszky's Disease

LÉPINE LEVADITI GRABAR and GIUNTINI^{*} have attempted to estimate the size of the virus of Aujeszky's disease by the methods of ultrafiltration and ultracentrifugation with a view to studying the technique and comparing the results. [The size of this virus had already been estimated by the method of ultrafiltration by ELFORD and GALLOWAY in 1936 as 100 to 150 m μ (this *Bulletin* 1937 v. 34 232)] these authors studied two strains of virus one a strain A P recovered originally from dogs in Hungary and subsequently passaged in rabbits which was sent to the reviewer in 1930 by AUJESZKY and the other a strain M I recovered from cattle in America and subsequently passaged in rabbits which was sent to the reviewer for study in 1932 by SHOPE.]

The present authors employed a strain which was apparently one of those recovered from cattle in France in 1936 by CRUVEILHIER TRUCHE and VIALA [this *Bulletin* 1936 v. 35 746]. The brains of cats or rabbits infected with the disease were used as the source of virus and guinea-pigs and cats as test animals for the infectivity of ultrafiltrates and centrifugates. Their ultrafiltration methods were based on those employed by the previous investigators and their estimate of 100 to 112 m μ agrees quite well with that already recorded. The size estimated by ultracentrifugation while employing the inverted capillary tube method and Elford's formula (for technique see LÉPINE *Ann. Inst. Pasteur* 1941 v. 67 380) was 68 to 100 m μ according to whether the assumed density of the virus particle was taken as 1.3 (nucleo-protein) or 1.16 (vaccin). The sedimentation constant is given as 8.8×10^{-11} . [In criticism in view of the restricted number of animals used in the tests and perhaps also because the less

* LÉPINE P. LEVADITI Jean C. GRABAR P. & GIUNTINI J. Ultrafiltration et ultracentrifugation comparées du virus de la maladie d'Aujeszky. *Ann. Inst. Pasteur* 1943 July-Aug. v. 69 Nos 7-8 238-41.

sensitized guinea pigs as employed (it is noteworthy that ELFORD and GALLOWAY's stock filtrates had a titre of 10^{-5} in rabbits whereas the present authors record titres in guinea pigs of 10^{-2}) the conditions of centrifugation just sufficient to ensure

$$\frac{C}{C_0} = \frac{\text{Area of concentration after spinning for time } t}{\text{Concentration in original unspun control}} = 0.1$$

does not appear to have been determined with sufficient accuracy. This may account for the lower figure given by this method of estimation when as a rule the tendency is in the opposite direction to the estimate by ultrafiltration is slightly lower. The authors state that contrary to the opinion of REMLINGER and BAILLY they found the guinea pig to be more sensitive than the cat however the observations are confirmed in number.]

The authors conclude that in view of the experimental difficulties the two estimations should be considered as being in fairly good agreement
Ian A Galloway

LEVINSON S O MILZER A SHAUGHNESSY H J NEAL J L &
OPFENHEIMER F Production of Potent Inactivated Vaccines with
Ultraviolet Irradiation II An Abbreviated Preliminary Report on
Sterilization of Bacteria and Immunization with Rabies and St
Louis Encephalitis Vaccines J Amer Med Ass 1944 June 24
150 No 8 531-2 (10 refs)

The inactivating effect of ultra violet light on bacteria and viruses was investigated by exposing continuously flowing thin films of infective suspensions to the rays of a specially designed lamp. Suspensions of *Bacterioides* and *Streptococcus enteritidis* 10 000 million *Streptococcus* and *Streptococcus pneumoniae* contained after an exposure of 0.33 second. Inactivation of the S 1 strain of fixed rabies virus in the form of a 4 per cent brain emulsion was obtained with a similar exposure when used as a vaccine the irradiated virus produced a considerably higher degree of immunity than standard phenolized vaccines and no significant loss of antigenicity occurred after storage at 5 C for six months.
Up to 0.66 sec exposure as necessary to inactivate the virus of Louis encephalitis in the form of a 4 per cent brain emulsion vaccine prepared from irradiated virus produced a high degree of immunity.
D J Bauer

MALARIA

WINTER BLYTH M A A Note on the Transmission of Malaria at
Ketti Nilgris 6300 Feet J Bombay Nat Hist Soc 1943 44
No 3 307-9 (Summary taken from Rev Applied Entom Ser B
1944 July 3 Pt 7 144)

Malaria is not usually transmitted in the Nilgiris at altitudes of more than 4000 ft. P. F. Russell explained an outbreak that occurred in September 1941 at an altitude of 6300 ft in the valley of Ketti by the fact that over 6000 labourers were brought during the year into

a place 2-3 miles away many of them from malarious districts. This might account for the outbreak in question but not for a few cases that the author records as having occurred in earlier years. He suggests that the easterly and north easterly winds that prevail respectively just before and just after the south west monsoon the periods at which the cases of malaria occurred enter the valley from the malarious plain and reach Ketti as a southerly breeze encouraging mosquitos normally found at low altitudes to ascend the valley. When these winds are blowing it is protected warm damp and marshy and would therefore favour Anopheline breeding.

SCHIAVI A Um caso de quartã registrado pelo nosso Serviço em Jupia [A Case of Quartan Malaria registered in Jupia] *Arquivos de Hig e Saude Pública* Sao Paulo 1943 Sept v 8 No 19 201-2 English summary

The author refers to another case of infection determined by *Plasmodium malariae* in Jupia district (State of S Paulo Brazil) and registered by Service of Prevention of Malaria of S Paulo Health Department. He relates that only eight cases of malaria engendered by this species of plasmodium have been up to 1943 registered in the State of S Paulo.

DE MELO V H Um caso autóctone de malária quarta no município de José Bonifácio Estado de S Paulo [A Case of Quartan Malaria in the State of Sao Paulo] *Arquivos de Hig e Saude Pública* Sao Paulo 1943 Sept v 8 No 19 205-7

DE MELO V H Um caso autóctone de malária quarta no município de Porto Feliz Estado de Sao Paulo [A Case of Quartan Malaria in the State of Sao Paulo] *Arquivos de Hig e Saude Pública* Sao Paulo 1943 Sept v 8 No 19 211-12 5 figs

CÔDA D Um caso de malária quarta no litoral Sul [A Case of Quartan Malaria in the State of Sao Paulo] *Arquivos de Hig e Saude Pública* Sao Paulo 1943 Sept v 8 No 19 215-16

UNTI Q Novas concepções sobre o ciclo evolutivo dos plasmodídeos [New Conceptions as to Developmental Cycle of Plasmodia] *Arquivos de Hig e Saude Pública* Sao Paulo 1943 Sept v 8 No 19 175-80 1 fig

The author traces the development of the modern conception of malaria as starting from the sporozoites invasion of cells of the reticulo endothelial system and the subsequent infection of the red blood corpuscles. The stages in the reticulo-endothelial cells are responsible for development during the incubation period and for later relapses of the blood infections which occur at varying intervals. [The article is a useful historical summary but it contains no new information unless the author's view that malaria is primarily an infection of the reticulo endothelial system and only secondarily a blood infection be regarded as such.]

C M Henson

AUSTRALIAN MILITARY FORCES Notes on Malaria for Medical Entomologists 1943 20 pp 6 figs Notified in G O s dated 30th June 1943 L H Q 1943 By Authority Arbuckle Waddell Pty Ltd 20 McKillop St Melbourne

This is an admirably clear and concise description of the natural history of malaria adequately illustrated. The notes were designed for the benefit of medical entomologists engaged on anti-malaria work. They contain much that is not of direct concern to the entomologist as such but nothing that is not essential to an appreciation of the importance and significance of the entomological side of malaria control. As an introduction to the study of malaria the pamphlet should be of great value to a much wider range of students than its title indicates.

Norman H Hile

KALANDADZE L I & SAGATELOVA I S [Effect of Dry and Moist Substrata on the Viability of Mosquito Eggs, *Med Parasit & Parasitic Dis* Moscow 1943 v 1^o No 2 24-31 2 figs. (In Russian)

After water collections have been dried in the course of anti-larval operations they are liable to be gradually refilled with water (by rain or irrigation) with the result that they are repopulated by mosquitoes developing from eggs or larvae that have survived at the bottom.

In order to elucidate the conditions under which this takes place the authors have studied the effect of dry and moist substrata upon the viability of mosquito eggs under laboratory conditions. In the experiment on the effect of dryness the eggs of *Anopheles maculipennis naul penensis* were removed from water and placed in crucibles (20 in each) containing dry earth, sawdust, plants, etc. In the experiments on the effect of moist substrata batches of 20 eggs each were placed on earth mixed with varying proportions of water. The test vessel (100 cc) being kept in a special apparatus in which the desired amount of moisture could be automatically controlled. In both sets of experiments after exposure for a certain period of time the vessels were filled with water. The eggs were then allowed to hatch and the larvae were left to complete their development. Similar experiments were carried out with *A. bifasciatus* and *Culex pipiens*.

It was found that the degree of resistance to desiccation in *Anopheles naul penensis* depended on the stage of development attained by the embryo. If this was far advanced the eggs remained viable after exposure on completely dry substrata for 6-29 hours (at 27-6°C). The eggs of the anophelines proved to be more resistant than those of the culicine mosquitoes. The viability of eggs kept on moist substrata (humidity 33.3 per cent) was considerably greater than that of eggs kept on dry substrata. Thus the eggs of *Anopheles naul penensis* survived on moist earth for 7 days at 21°C as compared with a maximum of 29 hours on dry earth. In experiments conducted under natural conditions it was shown that the period of survival of the eggs depends upon the amount of moisture present in the soil and on the rate of its drying.

It is concluded that the drying of water collections can only be effective as an anti-larval measure if it is complete since in the presence of the slightest amount of moisture in the bed mosquito eggs can survive for over a week and hatch later if inundated with rain water.

C A Hoare

- JUKOV N M & KRASHOVA V I [Epidemiological Role of *Anopheles maculipennis messeae* hibernating in the Houses in Siberia] *Med Parasit & Parasitic Dis* Moscow 1942 v 11 No 5 35-8 2 figs [In Russian]

The authors note that in 62 out of 150 houses (42 per cent) of a village in Siberia mosquitoes (*A. maculipennis messeae*) hibernate in cellars which communicate with the living quarters by means of a trap door in the floor through which the insects find their way into the rooms. The winter temperature in the cellars—which are used for storing food etc.—varies from 3.4 to 7.1 C. Mosquitoes have been captured in these houses from December to April mostly during twilight. It was found that the percentage of mosquitoes containing blood gradually rose from 5.4 in December to 28.1 in April during which period there was also an increasing number of females with ovaries in the 5th phase of development i.e. ready to lay eggs. It was demonstrated that the mosquitoes laid eggs in the moist soil of flower pots which were kept in the house. The dissection of 1080 mosquitoes captured during the winter months revealed one with sporozoites in the salivary glands while under experimental conditions 40.2 per cent of mosquitoes (77) fed in March on a patient harbouring gametocytes became infected.

It was thus shown (1) that in the presence of suitable human cases mosquitoes hibernating in Siberian houses may become infected and (2) that the parasites are capable of completing their development in the vector. House infections are therefore of epidemiological importance in Siberia and should be checked by destroying the mosquitoes in the houses after the outside windows of the cellars have been closed for the winter.

C A Hoare

- SABROSKI C W A Malaria Mosquito Survey of Southern Michigan
J Econom Entom 1944 Apr v 37 No 2 312-13

- UNTI O & RAMOS A S Sobre a fauna anofélica do vale do Paraíba (Diptera Culicidae) [The *Anopheles* of Paraíba] *Arquivos de Hig e Saude Publica* Sao Paulo 1943 Sept v 8 No 19 23-34 5 figs [15 refs]

- GALVAO A L A LANE J & UNTI O Sobre o *Anopheles noroestensis* Galvao e Lane 1938 *Arquivos de Hig e Saude Publica* Sao Paulo 1943 Sept v 8 No 19 37-48 6 figs [10 refs] English summary

- RAMOS A S Observações sobre os anofelinos do litoral paulista *Anopheles* (*Nyssorhynchus*) *tarsimaculatus* (Goeldi 1905) *Anopheles* (*Nyssorhynchus*) *osualdoi* Peryassu 1922 [The *Anopheles* of the Coast of Sao Paulo *A. tarsimaculatus* and *A. osualdoi*] *Arquivos de Hig e Saude Publica* Sao Paulo 1943 Sept v 8 No 19 51-62 8 figs [21 refs] English summary (8 lines)

- GALVAO A L A Chaves para a determinação das espécies do subgenero *Nyssorhynchus* do Brasil [Key to Species of the Subgenus *Nyssorhynchus* in Brazil] *Arquivos de Hig e Saude Publica* Sao Paulo 1943 Sept v 8 No 19 141-62 34 figs [48 refs] English summary

DEWHOFF E. & PIRER B. C. Laboratory Aids in the Diagnosis of Malaria. *J Lab & Clin Med* 1944 May 1 29 No 5 519 24 1 fig [10 ref]

The authors describe the methods they use in the diagnosis of malaria in an Army Hospital operating in the south and south west Pacific. The first year of practice what they call jungle medicine was a trial and error period for others as well as themselves who had not previously had much experience in the laboratory diagnosis of tropical diseases.

A description of the technique employed in finding malaria parasites follows.

It is stressed that the finding of parasites pigmented leucocytes and a high percentage of monocytes in the blood smear are the chief considerations in diagnosing malaria. Troops who are taking regular suppressive atabrin complicate the diagnosis because in less than 40 per cent will parasites be found (at least in the initial smear) and even then many of the parasites will be atypical in appearance. Because of this the authors stress the importance of searching for parasites in thick films but they point out that for species diagnosis thin films should also be examined. Blood films should be taken before treatment is started but this is not intended to imply that treatment should be withheld until after malaria has been diagnosed microscopically. The authors advocate repeated blood film examination at intervals of 4-8 hours in patients who are receiving suppressive therapy. [Presumably this is for malignant tertian cases only.]

In their experience parasites are generally found before the sixth film is taken usually in thick smears. Parasites may be difficult to find when large doses of atabrin or quinine have been given twelve hours previously.

A thick film prepared by placing a small drop of blood towards one end of a slide and spreading it so that the hands of a watch can just be seen through the blood. A thin film is prepared at the opposite end of the slide. This is then placed in a semi-vertical position to dry. The excess blood from the thick smear is allowed to drain down the slide to a heavy crayon mark placed about $\frac{1}{2}$ inch from the end of the slide. In damp weather the film is dried in a hot air chamber. Thick films are stained by Field's method (Bull. 1942 1 39).

Thin films are stained with a combination of Wright's and Giemsa's stain. Fourteen to sixteen drops of Wright's stain are floated on the centre of the thin film and allowed to stand for 4-1 minute. This is then diluted with 24-30 drops of distilled water buffered to a pH of 7.0. The mixture is allowed to set for about 10 minutes and the film is then well washed with water. It is then decolourized with 9 per cent ethyl alcohol and again stained this time with Giemsa diluted with 10 parts of buffered distilled water for about 30 minutes. Then it is washed, dried and examined.

The parasites of all three species as seen in thick and thin films are described.

Among other laboratory aids mentioned is the fact that in some cases 20 per cent of the white cells may contain malarial pigment. The blood of patients with cerebral malaria should be typed upon admission to hospital and a blood transfusion given at the first indication of rapid blood destruction.

[There is much in this article with which to disagree. There is no apparent advantage in sloping the slide containing the thick drop of blood. With practice a drop of blood can be so arranged that the depth is greatest in the centre and less towards the periphery. A thick film which is moved about or is in motion for some time before drying is liable to peel off the slide during staining with a watery stain. Probably the heat used in drying the films helped to prevent this.]

The method advocated for staining thin films is not to be recommended. One suspects that the authors were unfortunate in the brand of Wright's stain supplied. Furthermore the quantity of stain used for each thin film is extremely wasteful and must entail much care to prevent such a large quantity (2½ to 3 cc) of stain mixture per slide from spilling over the slide. If a good brand of Leishman or Wright stain is used four drops of stain and treble the quantity of distilled water should give excellent results but the distilled water should be either neutral or very slightly alkaline pH 7.2.

Ten to fifteen seconds with the stain alone is sufficient for fixing but in hot weather four drops of stain evaporate quickly and it is advisable to fix the film first in alcohol for a few seconds dry it and stain then even five seconds with the stain before diluting suffices followed by ten minutes staining with the mixture excellent results being obtained. If Leishman's or Wright's stain is working properly it should not be necessary to restain with Giemsa or any other stain. The authors advise that patients with cerebral malaria should be given a blood transfusion when there is an indication of rapid blood destruction. It would have been worth stating that the donor should be free of malaria so that a fresh infection may be avoided.]

P. G. Shut

PUHLMANN H. Ueber rudimentäre Malariaerkrankungen in den Wintermonaten [Rudimentary Malaria in Winter] *Deut med Woch* 1944 Feb 4 v 70 No 5/6 64-6 2 figs

In the case of various mild complaints particularly in the autumn or winter months patients who have had or been exposed to malarial infections may without having actual attacks of malaria show slight rises of temperature associated with severe headache. These may be isolated rises once every two weeks or continued fever over a period up to ten days or a fortnight. The examination of three or four thick films of the blood may be necessary before a malarial parasite can be found and an explanation given. There is little else to guide one to a diagnosis of the condition which is best treated by a combination of atabrin and plasmoquine. The parasite responsible is usually that of benign tertian malaria but occasionally the malignant tertian form is found.

C. M. Henson

RENIGER ARESHEVA M. L. Vitamin C in the Placenta and in the Foetal Organs in Malaria. 7 typed pp 2 pls [I from the Clinic of Puerperal Infections of the Institute of Obstetrics and Gynaecology of the Armenian S.S.R.]

The author during many years of study of the pathology of pregnancy in malaria has observed manifestations suggestive of scurvy in a number of serious cases. This condition of hypovitaminosis C is regarded as being provoked by the malarial condition and aggravated

by the pregnancy the author has studied it by estimating the concentration of vitamin C in the placenta and in the organs of the foetus and by comparison with normal control. Estimations were made by Tilman's method as modified by Harris and Ray.

Tables are given which show that in the spring there is a deficit of 0.35-0.95 mgm per cent in the vitamin C content of the placenta of women suffering from malaria in comparison with healthy women on the same kind of diet. In summer and autumn the average vitamin C content is higher especially in the controls but the difference between malaria and control patients may be as much as 7.15 mgm per cent. An overall average shows that the vitamin C content in malaria was 3.45 mgm per cent in healthy women 13.51 mgm per cent. In the tissues of the foetus there is a similar diminution in malaria. In the tissues of pregnant women who have died of *Plasmodium falciparum* infection the vitamin C content is very low. The more severe the malaria the greater is the reduction of vitamin C in all these tissues.

Vitamin C excretion in the urine was also investigated. It is known that this is reduced in pregnancy on a normal diet. In pregnant women with malaria the average of 13.7 mgm per cent is compared with the 75-41.9 mgm of normal persons.

In the opinion of the author such manifestations as petechiae, stomatitis, gangrene of parts of the limb and abortion in malaria cannot be explained by the action of the malarial toxin alone. The rôle of hypovitaminosis C must also be considered in these processes.

Charles H. Stocks

SCOTT J. G. Herpes Simplex Corneae in Malaria. (Memoranda).
Brit Med J 1944 Aug 12 113

Four cases (in three patients) of herpes simplex corneae occurred in a series of 4,000 cases of malignant malaria in Europeans in West Africa. The clinical diagnosis of malignant malaria was confirmed microscopically (ring forms) in 35 per cent of the cases. It is not stated whether malarial parasites were found in the three patients with herpes of the cornea.

Case 1—Herpes appeared on the lip on the 2nd day and on the right cornea on the 8th day. Staining showed multiple fissures in the corneal epithelium. Corneal sensitivity was diminished. Recovery took place in 10 days leaving one nebula. After another (the third) attack of malaria two months later the nebula had faded and sensitivity was normal.

Cases 2 and 3—The patient had herpes simplex corneae during the first and fourth of 5 malarial attacks and had herpes labialis in the 5th attack. On both occasions a dendritic ulcer of the cornea developed. The first herpes appeared on the 16th day in the left eye and healed under treatment with atropine and heat in 40 days leaving a scar. The second herpes appeared on the 7th day the dendritic ulcer developing on the old scar. The whole corneal epithelium was removed with an alcoholic solution of iodine 7 per cent and potassium iodide 5 per cent and recovery was obtained in 10 days leaving the old scar and impaired sensitivity. No eye complication developed in another attack of malaria which occurred 3 months later though the corneal sensitivity was still impaired. The original corneal scar was then less pronounced.

Case 4—Herpes of the cornea appeared on the 10th day a small ulcer formed near the limbus and was slow to heal. Under treatment with atropine and heat it healed in 5 weeks.

The author states in comment that the best results followed removal of the corneal epithelium with strong iodine solution J T Corson

FENTON RUSSELL D Cerebral Malaria [Correspondence] *Brit Med J* 1944 June 24 804

The writer of this letter believes that too much emphasis is placed upon the more severe types of cerebral malaria since in his experience in the Far East the milder types were more frequent. It was not uncommon to find a soldier accused of being drunk and disorderly, or absent from his unit, to be suffering from cerebral malaria. Many cases of impulsive violence in the Far East have been caused by quartan cerebral infection.

In treatment local experience is a good guide—3 to 10 grains of quinine may be given intravenously but as quinine abscesses are by no means rare the author cannot recommend intramuscular injection. He believes that a course of psychotherapy should be given in all cases of cerebral malaria if this were done some of the tragedies which follow the disease could be avoided.

Charles Wilcocks

GAVAN DUFFY C A Report of a Case of Cerebral Malaria *Indian Med Ga* 1944 May v 79 No 5 211

ROGAN J M Treatment of Cerebral Malaria [Memoranda] *Brit Med J* 1944 Aug 5 181

The author refers to recent reports of cases of cerebral malaria and in particular to one by SNEDDON [this *Bulletin* 1944 v 41 259] in which he considers the commentary on treatment to be seriously misleading. Various courses of treatment of cerebral malaria have been recommended in recent years by authors with much experience of the condition; these are given in tabular form. Since the outbreak of the present war, however, exceptional opportunities have occurred for the study of the disease and the author gives the following directions as representing the most recent recommendations of the Allied Forces.

Quinine dihydrochloride 6-10 grains should be given intravenously, very slowly—not exceeding 1 grain per minute and best at the rate of 1 grain in 2-4 minutes. The dose is dissolved in 10-20 cc of distilled water or normal saline (normal saline glucose for larger quantities). Subsequently 6 grains are given every 4-6 hours or 10 grains 8 hourly up to a maximum of 30 grains in 24 hours until recovery from coma occurs and satisfactory oral administration becomes possible.

Even when the prognosis appears hopeless intravenous administration of quinine should be continued. In a case reported by WHITEHILL [this *Bulletin* 1944 v 41 450] recovery took place after coma had lasted for over 3 days.

The author states that pulmonary oedema is a not uncommon terminal event in cerebral malaria and suggests that fluid [for the correction of dehydration] should be given through a Ryle's tube introduced into the stomach and connected to a drip apparatus as recommended to him by Lieut Col G A RANSOME I.A.M.C. rather than by a large intravenous infusion.

Other details mentioned as being important are a semi-recumbent posture for the patient and the performance of lumbar puncture as a

JOHNSON F H & SCHNYER L The Quinine Inhibition of Bacterial Luminescence *Amer J Trop Med* 1944 May \ 24 No 3 163-75 9 figs [28 refs]

It is not yet certain how the cinchona alkaloids exert their effect on malarial parasites. Probably enzyme systems in the parasite are affected by combination of the drug with its protoplasmic constituents. To throw light on this question the authors have investigated the inhibition produced by different concentrations of quinine on bacterial luminescence under varying conditions of temperature and pressure as well as the reversible nature of the reaction and the effect of mixing quinine with other inhibitors. Essentially non proliferating bacteria *Photobacterium phosphoreum* and *Achromobacter fischeri* were used in which the emission of light is due to oxidation by molecular oxygen of a substrate (luciferin) by an enzyme (luciferase). The organisms were cultivated at their optimum temperatures and emulsified in a phosphate buffered salt solution. After aeration they were mixed with quinine in the desired concentration. The intensity of emitted light was measured by means of a photoelectric cell and amplifier. The enzyme may occur in active or inactive form and is capable of combining with drug or metabolic products. Two types of combination are possible between enzyme and drug depending on the conditions accompanying the denaturation of the enzyme.

Addition of quinine to the cell suspensions caused a decrease of luminescence to a value which remained constant for a time and allowed of accurate comparison with the control. This inhibitory action of quinine involved a reversible combination between drug and enzyme was not due to killing of some of the bacterial cells and was practically independent of cell concentration at a given dilution. Analysis of the relationship between concentration of drug and inhibition of luminescence produced under constant conditions of temperature and pressure showed that 1 to 1.5 molecules of quinine combined with 1 molecule of enzyme.

The author concludes that the action of quinine is similar to that of other substances causing reversible denaturation of enzyme protein and the degree of inhibition is affected by temperature and pressure. He indulges in some speculation on the mechanism of quinine therapy based on his experimental findings and puts forward an explanation for the contrast in results of quinine treatment of different malarial parasites.

[This is a highly technical paper and will repay study by those interested.] J D Fulton

KELSEY F E GEILING E M K OLDHAM F K & DEARBORN E H Studies on Antimalarial Drugs the Preparation and Properties of a Metabolic Derivative of Quinine *J Pharm & Exper Therap* 1944 Apr \ 80 No 4 391-2

When quinine is incubated *in vitro* with various tissues it is converted into substances which no longer have the solubility or fluorescent characteristics of quinine. Apparently the livers of some species of animals are more active than others in this respect and more than one modification of quinine is produced. After incubation of quinine with sheep liver I J LIPKIN [this *Bulletin* 1920 v 15 127] isolated quinene and after incubation with guinea pig liver he isolated a second

product. Kelley and his associates worked with rabbit liver and isolated yet a third product. For the method of isolation and the chemical properties of this new compound the original should be consulted. Its formula and its relation to quinine have yet to be determined.

F. Harkin

PICK, E. P. & HUNTER, J. The Action of Atabrine on the Electro Cortico Potentials. *J Pharm & Exper Therap* 1944 Apr; 80 No 4 354-61 4 figs [20 refs]

If suitable electrodes are placed on the cerebral cortex changes of electrical potential can be recorded. In lightly anaesthetized cats and in frogs the changes take the form of characteristic rhythmic waves. Cats were anaesthetized by nembutal and given mepacrine (atabrine) 5-12 m/m per kg intraperitoneally or intravenously. The rapid wave frequency disappeared in 66 per cent of the cats and only slow waves of low amplitude remained. This effect indicates a central depressant action of mepacrine. Usually it did not appear until one hour or longer after the intravenous injection of mepacrine although sometimes it appeared within a few minutes according to the dose given. It persisted for 1 to 4 hours. Apparently it was related to the mepacrine content of the brain rather than to that of the blood.

Similar changes were seen in the electrocorticogram of pithed frog following the injection of 0.5-1 m/m mepacrine. Large doses of mepacrine caused blockade of reflexes and finally paresis and death. It is recalled that mental disturbances occasionally follow the clinical administration of mepacrine [these mental disturbances are rare unless large doses are given. Hyperexcitability is more common than depression]. It is believed that these changes in the electrocorticogram are another manifestation of the same action.

F. Harkin

GORGAS MEMORIAL LABORATORY ANNUAL REPORT 1943 [CLARK, H. C. Director] 4-14 Experimental Work in Control of Malaria by Use of Drugs

This is a report of the 13th year's observations of the control of malaria by the use of drugs in the Panama Canal Zone. Since the last report four new conditions have been operative which might influence the malaria parasite and the villages under observation. Copper sulphate has been widely used to kill aquatic vegetation along river banks and lagoon areas during the rainy months of the year. The health authorities have been using a high powered paring green dusting apparatus over the same area once a week. The impounded water of Madden Dam above the observation villages has been used at intervals to flush the aquatic vegetation from river and lagoon downstream. The chief anopheline breeding place for the observation villages are however in small branches of the river behind the villages. These have not been affected by any of the three measures. Lastly, villagers have returned after periods of employment outside sanitized areas where they were housed in uncreened quarters with a higher parasite index than when they left the villages under drug control.

The atabrine group of villages consisted of Santa Rosa, Guayabilito, Gaturcio, Las Guacas and Agua Clara, quite close together on the banks of the Chagre River. The quinine group was composed of the inhabitants of New San Juan, approximately equal in number to the

combined population of the atebirin villages. New San Juan is on the Gatuncillo branch of the Chagres River. Bi-monthly thick blood film surveys were made of both groups. Persons harbouring parasites were given either atebirin 0.1 gm. thrice daily for 5 days or 18 grains of quinine sulphate a day for 5 days.

The inhabitants of Rio Pescado and Mendoza with a small group from Los Azules formed the control population. These places are on the west side of Gatun Lake, the Chagres villages on the east. The control group was surveyed monthly. A list of persons harbouring parasites was given to the local village office and to the school teacher. Those whose names appeared on the list could obtain free quinine if they desired to take it. Most of the families used very little of the drug.

The average monthly parasite rates and the cumulative rates for the year of the various groups (not including relapses) were —

	Rate	
	Monthly	Cumulative
Atebirin group	10.9	30.5
Quinine group	8.9	20.9
Control group (Rio Pescado)	25.0	45.7
Control group (Mendoza in the hills)	4.6	11.8
Control group (Los Azules)	13.6	26.9

The coming and going among the populations constituted insuperable obstacles to complete surveys and complete treatment.

The species of parasites found in 137 persons with relapses were *P. falciparum* 61.4, *P. vivax* 28.1 and *P. malariae* 10.3 per cent. The clinical relapse rates in the quinine and atebirin supervised groups for the various species of parasite were *P. falciparum* 9.8, *P. vivax* 16.3 and *P. malariae* 17.6 per cent. The author remarks that general opinion seems to underestimate the importance of relapse in *P. falciparum* infections.

Only one baby during the first year of life was found infected in the treated villages; it was infected elsewhere. The control village Rio Pescado had five infected babies and Mendoza two.

The malaria infection rates generally were a little lower than in the previous year. Malaria incidence in 1943 was below the average throughout the Caribbean and Isthmian regions. [For previous reports in this series see this *Bulletin* 1944 v. 41: 9.] Norman White

CLARK H. C. Recent Research in Prophylaxis and Treatment of Malaria. Report for 1942-1943. *J. Nat. Malaria Soc.* Tallahassee Fla. 1944 June v. 3 No. 2 85-94 [20 refs.]

RIBBANDS C. R. Camp Siting in Malarious Districts of West Africa. *J. Roy. Army Med. Corps* 1944 Apr. v. 82 No. 4 157-64 2 figs.

Experimental work in West Africa on which this paper is based has shown that camp siting is an anti-malarial measure of great importance even in areas where there are no anopheline-free districts. Whatever the anopheline density, susceptible uninfected troops can remain free from infection if their camp be 5 miles away from the nearest infected human population and the risk is but small at a distance.

of 2 miles. If however anophelies are breeding between the village and the camp these distances should be increased to 8 and 3 miles.

If the camp form part of an existing community it should be remembered that the number of anophelines per person is inversely proportionate to the size of the community. The malaria risk is usually much greater in villages than in towns. If the complete removal of the infected native population be impracticable as it generally is, partial removal is worse than useless unless it be the removal of the hidden, the richest reservoir of infection. If the camp and infected community are separated but within mosquito range the one from the other an increase in the size of the community will tend to reduce malarial transmission in the camp if the anopheline breeding places are nearer to the community than to the camp. If the breeding places are adjacent to the camp increased native population in the infected community enhances malaria risks in the camp.

When white troops and native troops have to be camped together in malarious districts the native lines should be placed between the anopheline breeding places and the white lines. The native troops may serve as an efficient protective screen for the white troops.

If two sites equidistant from anopheline breeding ground be available the higher should be chosen. Altitude deters anophelines. But clearing near camps is not an effective measure of protection against either *A. gambiae* or *A. f. nestis*.

An appendix describes the palp markings characteristic of the common West African vectors and another describes a simple method of determining the density of adult mosquito infestation.

No malaria White

H	IT	R	I	Recent Research in Avian and Simian Malaria	J Nat
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BLACKWATER FEVER

WILSON T E. Blackwater Fever. *Med J Austral* 1943 Nov 20
v 2 No 21 414-18 2 figs

This is an account of two cases of blackwater fever. The patients were Australian soldiers who had almost certainly become infected with subtertian malaria in Papua (New Guinea) although no subtertian malarial parasites were found either in the blood or the bone marrow. In civilian life before the war they had travelled in malarious countries and had had several attacks of malaria. During their period of treatment in hospital repeated differential cell counts of the bone marrow were made as well as other observations so far as local facilities permitted. The patients were given blood transfusions, intravenous infusions of 5 per cent glucose saline solution and large amounts of fluid by mouth including sodium citrate solution. The various laboratory observations and the record of fluid intake and output are shown in tables.

The first patient received a blood transfusion of 2½ ounces of citrated blood on each of the first 3 days of treatment. 390 ounces of glucose saline solution intravenously and 10 ounces of fluid by mouth in the first 5 days. The output of urine during this period was 484 ounces.

the lowest daily amount being 67 ounces. His urine regained its normal colour on the 4th day and he was convalescent on the 18th day. A point of interest is that 7 days before blackwater appeared he had a severe attack of fever and began a five day course of atebuin 0.1 gm tid on the 6th day he felt abdominal pains and malaise and on the 7th day his urine became black.

The second patient had had several attacks of fever in Syria in 1941. He first went to Papua in August 1942 and had much fever during the 10 months before his admission to hospital with this attack of blackwater fever in July 1943. On admission he was ordered quinine 10 grans tid but after the third dose his urine became black. Numerous trophozoites of *Plasmodium mnx* were found in his blood on one day only, the first day after admission. He was given eight blood transfusions (total 395 ounces) during the first 5 days, 202 ounces of glucose saline solution in the first 6 days and 1266 ounces of other fluids by mouth during the first 12 days. The output of urine during the first 12 days was 1863 ounces. The urine became of normal colour on the 8th day and he was convalescent by the 23rd day.

In both cases the normoblast cells of different stages of development in the bone marrow increased in number considerably during the early days of the illness and gradually returned to normal after haemolysis had ceased.

The author suggests that blackwater fever is due to sensitivity produced not by quinine but by a by product liberated from the parasites by an anti malarial drug.

J F Corson

SINGH I & SINGH I Treatment of Blackwater Fever *Indian Med Ga* 1944 June 1 79 No 6 26-8

The authors treated 37 cases of blackwater fever. All the patients had had malaria (1-5 attacks) during the preceding 12 months. 34 with subtertian and 3 with benign tertian but two of the latter had crescents in their blood. All except one who was bedridden were going about their work when the attack of blackwater occurred but they were taking antimalarial drugs. 18 were taking quinine, 18 pamaquin and 1 mepacrine. In one the attack took place in April in all the others between October and March. Thirty five were debilitated and two in apparently good health.

Haemolytic substances were found in the blood but their presence was very transitory.

Treatment—The authors emphasize the good effect produced by giving concentrated antivenene [unspecified] intravenously. They treated 36 patients with it and all recovered while the remaining patient for whom it was not available died. They gave 20 cc then 10 cc four hourly for 72 to 96 hours no further haemolysis occurred. Other treatment included the administration of sodium citrate by mouth and iv glucose with vitamin C iv calcium gluconate blood transfusion in three cases the bloods being matched under the high power of the microscope. The resulting anaemia and debility were treated with Fersolate vitamin B vitamin C crude liver extracts cod liver oil and a generous diet. No antimalarial drugs were given although subtertian parasites were still present after the haemolysis had ended.

J F Corson

TRYPANOSOMIASIS

VAN HOOFF L. HENRARD C. & PLEEL E. Pentamidine in the Prevention and Treatment of Trypanosomiasis *Trans Roy Soc Trop Med & Hyg* 1944 Feb 1 37 No 4 211-80

The rate of disappearance of *Trypanosoma gambiense* from the blood after treatment with pentamidine (diaminodiphenoxypentane) is slow. In guinea-pigs treated with a single dose of 3 mgm per kgm the trypanosomes disappeared in 41-54 hours. In patients treated with 2 mgm per kgm trypanosome disappeared from the gland juice after 48-72 hours. After a single dose of 3 mgm per kgm infected guinea-pigs did not relapse after 2-3 mgm per kgm about half relapsed in 11-120 days after doses of 1.5 mgm per kgm or less relapses occurred in 15-91 days number of guinea-pigs used not given. Tryparsamide fast strains responded to pentamidine as well as other strains did. When repeated doses were given to guinea-pigs 3 mgm per kgm was the largest dose tolerated and not more than 2 injections should be given each week. The best results were obtained with 1-2 mgm per kgm.

Two patients with early trypanosomiasis were treated. One was given 10 injections each of 0.05-0.1 gm (total 0.95 gm) twice weekly and was cured. The other received two injections of 0.1 gm and three of 0.14 gm but he showed intolerance and treatment was continued with tryparsamide and suramin. These doses of pentamidine calculated at 1.3 mgm per kgm were injected intramuscularly. Fourteen cases of advanced sleeping sickness with pathological changes in the cerebrospinal fluid were treated without significant benefit. In a few cases a combination of pentamidine tryparsamide and suramin was more effective.

Twelve guinea-pigs were given a single dose of 2 mgm per kgm or three doses of this amount repeated during a period of a few days. The guinea-pigs were then exposed to infection at repeated short intervals from the bite of infected tsetse flies or from injection of infected blood. Trypanosome did not appear in the blood of the guinea-pigs until after periods of 2 to 37 days in many cases they did not appear until after 100 days. Unfortunately it is not clear in these experiments whether infection was actually prevented during these periods or whether the results were due to a prolongation of the incubation period. Apparently the drug has a prolonged action with a slow rate of elimination or excretion similar to that of suramin.

Two volunteers were investigated. Bonkumu received 2 mgm per kgm on Aug 9th 1941 and Moya received 3 mgm per kgm on the same date. Infected tsetse flies were fed on them every 2-3 days and frequent blood examinations and blood cultures for trypanosomes were made. Moya was found infected on June 1st 1942 a blood culture was positive on June 6th and tsetse flies were infected from him on June 2nd. Bonkumu was found infected on Aug 10th 1942 blood culture was not positive until Aug 7th but tsetse flies were infected on Aug 24th and 25th. The clinical course of the two infections was peculiar. Trypanosomes were scanty blood cultures and tests for xenodermosis yielded negative results for long period after the infection had first appeared and then disappeared and the temperature remained normal. No local reaction occurred at the site of injection. Both volunteers were cured with suramin. Unfortunately no description is given of untreated volunteers but similarly exposed to

infection as controls the results as set forth permit the alternative explanation that the strain or strains of trypanosomes used were only feebly pathogenic for man infection occurring only rarely and being very mild when it did occur] Infected tsetse flies fed on animals treated with pentamidine do not become disinfected and the development of infection in the fly is not prevented by this means Field trials are now being made on the prophylactic action of pentamidine In villages containing 500 inhabitants in a heavily infected part of the Kwango district half the people were given an intramuscular injection of 2-3 mgm per kgm Three months later no new case was found among those protected while 25 per cent new infections have been discovered among the controls [FULTON (below) gives a different explanation to the observations here recorded his paper should be consulted

F. Hasting

FULTON J D The Prophylactic Action of various Aromatic Diamidines in Trypanosomiasis of Mice *Ann Trop Med & Parasit* 1944 Apr 19 \ 38 No 1 78-84

The following 4 4 diamidino derivatives were tested —diphenyl ethane stilbene monomethyl stilbene dimethyl stilbene 2 hydroxyl stilbene tolane diphenyl ether and diphenoxy propane and pentane A single dose of half the maximum tolerated dose (0.5-1.0 mgm per 20 gm mouse) was injected into mice which were later inoculated after a suitable interval with light suspensions of *T. rhodesiense* or of *T. congolense* With diphenyl ether there was no protection after one week with diphenylethane and tolane the protection lasted 2-3 weeks With the other compounds complete protection lasted 2-4 weeks The prophylactic power of the drugs is proportional to the curative index In mice not completely protected the infection often an a prolonged irregular course

Fulton also comments on the experiments recorded by VAN HOOFF *et al* (above) Fulton has observed in his own experiments that if mice were treated with pentamidine and then inoculated at frequent intervals with *T. rhodesiense* apparent protection was observed for periods up to 8-24 weeks But this protection is due to immunization produced by the frequent injections of trypanosomes and not to the prophylactic action of the drug (after the first 2-4 weeks) He considers the protection observed by van Hoof *et al* to be due to similar causes

F. Hasting

NISSELE A Studien zum Problem der Pathogenität toxinfreier Mikroorganismen (Trypanosomen) und des Wirkungsmechanismus chemotherapeutischer Mittel (nach früheren Versuchen) [Studies on the Pathogenicity of Trypanosomes and the Action of Chemotherapeutic Substances (Early Work)] *Ztschr f Immunitätsf u Exper Therap* 1943 Dec 11 \ 104 No 2/5 274-82

CHAGAS FILHO C Moléstia de Chagas no Brasil [Chagas's Disease in Brazil] *Ilustração Médica* Rio de Janeiro 1944 Apr \ 10 No 1 31-4

LEISHMANIASIS

DEVINE J. Experiments on the Properties and Quantitative Determination of 4-4 Diamidino Stilbene Dihydro chloride (Stilbamidine)
J. Am. Trop. Med. & Parasit. 1944 Apr 19 v 38 No 1 35-45
 - 6*

A colorimetric method for determining the concentration of stilbamidine is described which depends upon the development of a yellow colour with hexavalent vanillin. The depth of colour obtained is measured by a Hilger's Spekker absorptionometer. The test is as follows: 2 cc. of stilbamidine solution containing not more than 0.1 m.m. per cc. are mixed in a thin glass test tube with 1 cc. of 10 per cent glyoxal (B.D.H.) plus 2 m. of 3N NaOH and heated by immersing in a boiling water bath for 30 seconds. The tube is removed cooled under running water for 15 seconds then immersed in melting ice for five minutes. Finally 1 m. of 1N H₂SO₄ (60 cc. of concentrated acid diluted to 144 m.) is added quickly with shaking the tube is warmed slightly in the hand to prevent subsequent moisture condensation on the cell during reading and the solution is transferred immediately to the absorptionometer cell for determination with no. 7 (dark blue) filters. Several important precautions are necessary to obtain a reliable result for the effect the original paper must be consulted. This method measures down to 0.01 m.m. A spectrophotometric method described by GOODWIN in *B. J. Clin.* 1943 v 40 684 has a sensitivity of about the same amount.

By the use of these methods it is demonstrated that when a solution of stilbamidine is exposed to good sunlight for about two hours the effect of the compound are transformed into a derivative which does not respond to this test. After 10 hours a stable state is reached. For full details see FULTON and LORKE in this Bulletin 1943 v 40 23 FULTON *ibid.* 683 and GOODWIN *loc. cit.*

According to BARPER SLACK and WIEN *ibid.* 376 the chief product is 4-4-diamidino-phenyl benyl carbinol formed by hydration of the central double bond. Stilbamidine is relatively stable to light in the solid state. When dissolved in serum or plasma stilbamidine can be quantitatively assayed by preliminary deproteinization with dialysed iron. A simple method described by HENRY and GRINDLEY (this Bulletin 1943 v 40 122) can be used to measure concentrations of stilbamidine as low as 0.02 m.m. per 100 cc. in a few drops of fluid but the accuracy is only about 50 per cent. F. Harkin

PRICE F. L. & MAYER R. A. A Case of Kala Azar. *J. Am. Med. Ass.* 1944 June 17 v 125 No 7 490-92 2 figs.

1 In a case of kala azar the diagnosis was made by finding *Leishmania donovani* organisms in smears of splenic pulp.

2 Treatment with a pentavalent antimony compound brought about prompt clinical improvement.

3 Treatment was complicated by an exacerbation of fever abdominal pain and bloody diarrhea which may or may not have been caused by the administration of neostibosan.

NATTAN LARPIER L. RONCHÈSE A. D. & STEEG L. Les infections expérimentales du Merion par *Leishmania donovani* [Experimental Infections of the Vole with *L. donovani*] *Arch Inst Pasteur de Tunis* 1942 Dec v 31 No 3-4 212-21

Experimenting with the N African vole (*Meriones shawi*) the authors have found that it is susceptible to infection with a canine strain of Mediterranean *L. donovani* isolated from a dog in Nice. The infection appears to follow inoculation with regularity but it is of a chronic character. In some cases it was proved that the young born of infected females were already infected at birth. It would seem that the vole is a more suitable animal for experimental work than the golden hamster of Palestine (*Cricetus auratus*) but less suitable than the spermophile (*Citellus citellus*) in which an infection runs a more rapid and regular course.

C. M. Wenyon

FEVERS OF THE TYPHUS GROUP

GONZÁLEZ E. Consideraciones sobre las reacciones biológicas en el diagnóstico del Tifus exantemático y especialmente en la fiebre tipo murino [Comments on the Biological Reactions in the Diagnosis of Exanthematic Typhus especially of the Murine Type] *Gac Med de Caracas* 1944 Apr 15 v 52 No 7 78-87

The problem of the fevers of the typhus group in Venezuela is discussed.

Louse borne typhus locally known as Guacarapa fever fevers of Caracas etc. has been recorded in the State of Miranda and the Federal District from time to time between the years 1883 and 1931.

Typhus of a doubtful type has been reported from Bolívar State in 1921 and 1935.

Murine typhus has been reported since 1939 in Bolívar State and Caracas. In Caracas 31 among 500 rats examined had positive Weil Felix reactions all but one at titres of 1-50 to 1-100.

The author asks whether historic typhus has disappeared from Venezuela and if so—why?

John W. D. Megaw

SPAET G. Investigations into the Aetiology of Exanthematic Typhus *J Trop Med & Hyg* 1944 June July v 47 No 3 28-30

In this paper freely translated by Sir John Megaw K.C.I.E. the author records his work at the Institute of Bacteriology of Chile. This work was a continuation of his earlier investigations in Prague (*Med Klin* 1934 v 30 No 42 1395) on typhus fever in experimentally infected guinea-pigs. These experiments led him to conclude that failure to cultivate the organism on cell free media was due to the presence of anti bacterial substances in the blood. In Santiago the author made lumbar punctures on a number of patients who had severe meningitic symptoms. He added the cerebrospinal fluid in 10 cc amounts to large flasks containing 150-200 cc of Levinthal's medium and obtained an abundant growth of small slender bacilliform organisms closely resembling Rickettsiae. These organisms were at first highly virulent to guinea-pigs but in the course of successive passages the virulence diminished and was finally lost.

In 1942 during a small epidemic of mild typhus the author again tried to obtain cultures from the cerebrospinal fluid of patients but the results were negative. Guinea-pigs were inoculated with the blood of these patients and did not show a febrile reaction before the 20th or 22nd day resembling in this respect the results of the inoculation of the author's attenuated culture. Three guinea-pigs died and showed *post mortem* inflammatory lesions of the typhus type. It was not possible to test the surviving guinea-pigs for immunity owing to the sudden ending of the epidemic. The author therefore and other workers to complete the investigation by carrying out immunity tests.

J. F. Corson

RAETIG, H. Die Blutsenkung bei Fleckfieber. Ein Beitrag zur Frühdiagnose. The Blood Sedimentation Rate in Typhus Fever. A Help to Early Diagnosis. *Deut. Med. Wochenschr.* 1944 Jan. v. 9 No. 1: 5-7. 3 figs.

Curves showing the average increases in the Westergren erythrocyte sedimentation rate in typhus fever indicate that the rise is much slower and less pronounced than in other severe infections.

For example the average rate in a large number of cases of typhus fever on the fifth day was about 15 mm after one hour as contrasted with about 80 mm on the same day in case of pneumonia. In some cases of typhus there was actually a fall in the rate usually there was a gradual rise reaching a maximum of about 30 mm on the average by the 17th day. On the same day in the pneumonia series the reading averaged 125 mm.

The great variation of the sedimentation rate in typhus were not related to the severity of the attacks or to the occurrence of complications. In one mild case the highest reading after one hour was 6 in another it was 7. In one very severe case with bronchopneumonia it was only 7. In another severe case with bronchitis it rose to 67.

A relatively slow and moderate rise in the sedimentation rate is regarded by the author as an important clue to the diagnosis especially in the early stages before the appearance of the rash or the occurrence of positive Weil-Felix reaction. So also a rapid rise to a high level is strong evidence that the patient is not suffering from typhus fever.

John W. D. Megaw

KUHLMAN, F. & HEINRICH, K. Ueber Kreislaufstörungen beim Fleckfieber. [Circulatory Disturbances in Typhus Fever.] *Deut. Med. Wochenschr.* 1943 Dec. v. 8 No. 12: 679-83. 6 figs.

This note deals with the cardio-vascular lesions in a group of 20 patients aged 20 to 47 years.

Electrocardiogram often showed an increase in the length of the P-Q interval toward the end of the febrile stage and early in convalescence. An appreciable increase in the Q-T interval toward the end of the fever was observed in all but two of the cases. The T wave showed progressive flattening some times also a tendency to be biphasic or to show a negative after wave. This condition was most pronounced on or two days after defervescence. The normal condition was reached by the end of the fourth week of convalescence except in cases complicated by nephritis though in some cases there was still evidence of myocardial damage up to the sixth or eighth week.

The association of indications of damage to the central nervous system with vascular lesions is discussed with special reference to the localization of the lesions

In some cases there was an extreme lowering of the diastolic blood pressure towards the end of the fever and even in early convalescence this often yielded to strychnine

The necessity for avoidance of effort during convalescence is emphasized

John W D Megaw

SEIFERTH L B Ueber die Störungen des Hor und Gleichgewicht apparatus und ueber die entzündlichen Ohrerkrankungen beim Fleckfieber [Disorders of Hearing and Equilibrium and Inflammatory Diseases of the Ear in Typhus Fever] *Deut med Woch* 1944 Jan 21 v 70 No 3/4 23-4

The investigations described in this paper were carried out in field service conditions

The first symptom of ear trouble is tinnitus this is soon followed by giddiness and partial deafness Patients who were sufficiently conscious to recollect what happened said that the symptoms appeared on the second or third day

About 80 per cent of all the typhus patients had ear symptoms and in 73 of 80 patients with deafness this was regarded as being due to a central lesion Four of the other cases were associated with an increased pressure of the cerebrospinal fluid and three with internal-ear trouble which started in the third week

The prognosis in cases of ear trouble was good on the whole but the author had no personal experience of what happened later in cases in which the complications appeared late in the illness

No less than 15 per cent of all the typhus patients had suppuration of the middle ear which usually began in the third week and in some cases was profuse

In 32 cases mastoid operation was needed the results were good except that one patient died of otogenic meningitis

The prevailing organisms were haemolytic streptococci and staphylococci

Pilocarpine was employed with success in the treatment of the early manifestations of ear trouble and lumbar puncture was valuable in cases with high pressure of the cerebrospinal fluid

Otherwise the treatment of the ear complications was on the usual lines

John W D Megaw

WOLMAN M Treatment of Typhus with Anti Typhus Horse Serum
Lancet 1944 Aug 12 210-12

The anti typhus serum was prepared from two healthy horses which had been immunized by injections of increasing doses of living Rickettsiae from the intestines of infected lice The injections were given at five to six day intervals over a period of two and a half months The horses were then bled twice—five and ten days after the last injection respectively In each subsequent month the horses were given a further course of three injections consisting of 250 375 and 500 louse intestines and two further bleedings were made

The blood was collected in large sterile bottles to which a 5 per cent solution of sodium citrate had been added to the amount of one tenth of the capacity. The serum was removed and preserved with methylate cresol.

Alternate cases to the number of 220 were treated and there were 220 untreated controls. The doses were of 20 cc each, they were given subcutaneously, two on the first day of treatment and one on each of the following three days.

The relevant data are shown in the table.

	Treated	Untreated
Complications	44	47
Reactions	7	11
Local pyrexia	11	14
Death	11.99	13.5
Reactions	5	17
Deaths	8	4
	(=3.6 per cent)	(=10.9 per cent)

Among 176 cases in which treatment was started on or before the 6th day there was no death. The only four serum reactions, one of these was quite serious. Abscesses occurred at the site of injection in seven cases early in the investigation owing to faulty technique.

Among 176 untreated patients in whom the Weil-Felix test was carried out on five occasions at weekly intervals 60.2 per cent showed a rising titre and among 118 untreated the Rickettsia agglutination reaction showed a rising titre in similar conditions in 45.8 per cent.

In more than 70 per cent the Widal reaction was positive at some stage. The treatment did not influence the titre of agglutination in any of the reactors. Stress is laid on the necessity for early treatment.

It is enough to inject one or two in some cases but this route was soon abandoned, it is thought probable that one or two of the deaths might have been due to these injections.

John H. D. Meade

MEDICAL J AUSTRALIA 1944 June 24 Vol 26 592 Endemic Typhus

A statement is here reproduced from the Chairman of the National Health and Medical Research Council in which it is pointed out that 174 cases of endemic typhus were reported during 1943. Of these 124 occurred in metropolitan areas—viz (11) Melbourne (1) Brisbane (11) Adelaide (1) and Perth (100). It is asserted that this disease originates in rats and is flea-borne and the statement points out that the incidence is higher than ever before and draws attention to the increased risk of endemic typhus and of the importation and spread of plague.

Charles H. Wilcocks

MÜHLENS Ein Fall von Rattenfleckfieber aus dem Mittelmeerraum A Case of Rat Typhus in the Mediterranean Area *Deut med Wch* 1943 Dec 10 69 No 49 50 S32 3

The author reports a case which appears almost certainly to have been one of flea-borne typhus. The patient was a German soldier quartered in an isolated house near a small mountain villa in Crete.

Exposure to the risk of louse borne typhus could be excluded and rats were found on the premises

The case would not call for comment but for the surprising fact that the chief ground on which the author excluded louse borne typhus was a positive agglutination reaction to *Proteus* X19 1-3 200 and to *Pr* X2 1-400. A table is reproduced apparently from a recent text book in which the fevers of the typhus group are classified according to the types of *Proteus* agglutination reaction in this the flea borne fevers are shown as giving a weak reaction with *Pr* 12 and this organism is not shown as being agglutinated in cases of louse borne typhus. [Apart from the inherently faulty nature of the table the author seems to have fallen into the elementary error of assuming that such tables show types of reaction which are constantly found whereas of course they can only show average types and the actual findings are subject to a wide range of variation]

John W D Megaw

PETERSON O L Therapeutic Effects of Forbisen and of Toluidine Blue on Experimental Typhus *Proc Soc Exper Biol & Med* 1944 Mar v 55 No 3 155-7

Among a large number of drugs that were tested Forbisen and toluidine blue were the only ones giving appreciable results in the treatment of experimental typhus fever in mice

The drugs were given mixed in various proportions with the diet (fox chow) and the mice were inoculated intraperitoneally before or after drug administration was started with suspensions of yolk sac cultures of murine Rickettsiae in doses which killed 80 to 100 per cent of untreated animals

Forbisen was found to be moderately effective. In one test 14 of 24 mice survived when the drug was added to the diet in the proportion of 2.5 per cent. All the untreated controls died

Toluidine blue was found very efficacious in preventing death and the animals that died survived longer than the controls. The optimum dosage was 5 to 20 mgm daily this represented a concentration in the food of 0.25 to 0.75 per cent. Among 19 mice fed on a concentration of 0.5 per cent beginning 24 hours before infection there were 14 survivors and among 20 others in which the drug was started at the time of infection 15 survived. In another group of 20 the drug was started 24 hours after infection and 10 survived. Only two of 20 control mice survived

When the administration of toluidine blue was started 48 to 72 hours after infection there was no significant reduction in the mortality rate

In similar experiments on cotton rats no benefit was observed but these animals were inoculated intracardially with Rickettsiae and they fed only at night and irregularly

Toluidine blue had a marked action in reducing the toxicity and infectivity of murine Rickettsiae *in vitro* when added to suspensions of the organisms at a concentration of 1 in 10 000. The suspensions were kept nearly at the freezing point for an hour and then injected intravenously into mice. Of 18 mice inoculated with varying doses of the treated suspensions only four died of infection there were no survivors among 18 mice injected with the same doses of untreated suspension and of these 11 died within two to eight hours of intoxication the rest died later of infection. When very large doses of the treated suspensions were given all the mice died of intoxication

When epidemic strains of *Rickettsia* were treated in the way described above there was no reduction in their toxicity but when they were kept in contact with the drug for three hours in the cold or for one hour at 37°C there was some reduction.

John W. D. Meacham

YELLOW FEVER

BATES M. Observations on the Distribution of Diurnal Mosquitoes in a Tropical Forest. Reprinted from *Ecology* 1944 Apr. v. 25 No 2 159-70 1 fig. [15 refs.]

This paper deals mainly with the habits of *Haemagogus capricornis* which is one of the chief carriers of jungle yellow fever in Colombia. This mosquito is to be found most commonly in the forest canopy and comes into contact with man particularly when the trees are cut down. The author considers that *Haemagogus* is kept in the tree tops by a response to the humidity gradient and a avoidance of zones with a relative humidity exceeding 80 per cent. It becomes more abundant at ground level in open dry localities or after a succession of clear days. Other species of mosquitoes have not been studied in so much detail but their distribution in the forest is believed to be due to reactions to light, temperature and humidity, different species having different preferences in the same gradients. As a result some prefer ground level some prefer the tree tops others have a random distribution. The diurnal mosquitoes of the forest fall into two groups, those with peaks of activity in the morning and afternoon (e.g. *Eserpho a. serax*) and those with a single peak towards midday (e.g. *H. m. capricornis*). Although there are some exceptions the metallic bright-coloured species seem to predominate at the higher forest levels, the non-metallic species at ground level. The author concludes that the metallic coloration is an adaptation to life in relatively dry environments.

I. B. W. Lessworth

DE ASSUMPÇÃO L. Provas de imunização e neutralização cruzada entre o vírus neurotrópico da febre amarela clássica e o vírus isolado de doentes de febre amarela silvestre na epidemia de 1936-1937 no Estado de São Paulo. [Cross-immunization and Neutralization between the Viruses of Yellow Fever and the Jungle Type Isolated in the São Paulo Outbreak of 1936-37. *Arquivos de Hygiene e Saúde Pública* São Paulo 1943 May 8 No 18 91-108 [14 refs.] English summary]

Camorndonos [a Brazilian house-rat, guinea-pigs and rabbits] were immunized with three strains of virus: a classical neurotropic strain F634 and two strains D² and D12 from two patients suffering from the jungle type of yellow fever. In a series of protocols described in the paper the author shows first that the animals concerned were properly immunized. Next that the camorndonos which had been immunized with the classical yellow fever virus were immune to both the jungle strain. The corollaries of this were also proved, namely that animals immunized by either of the jungle strains were immune to inoculation by either of the others whereas all the controls died.

He then proceeded to make neutralization tests by which the virus of either of the jungle types and that of the classical type were neutralized by the serum of either D2 or D12 and either of the latter viruses was neutralized by serum of the first and the serum of the other. In the words of the author

(a) Serum of normal rabbits or of those inoculated with brain tissue (without virus) protected none of five camondongos infected with yellow fever virus (0/5)

(b) Immune serum of F654 protected camondongos inoculated with the same virus protected all (5/5) showing that in the former test death was due to yellow fever and not to some accidental contamination

(c) Immune sera prepared with D2 and D12 neutralized the virus of yellow fever (F 654) all five camondongos surviving (5/5)

(d) Similar tests were made with sera of guinea-pigs immunized or vaccinated with virus F 654 and with D 12

(e) The results of protection tests were the same as those made with the rabbit immune sera confirming the previous tests of cross neutralization between these jungle yellow fever viruses

H Harold Scott

JONES T C & MAURER F D Attempts to produce Jaundice in Horses by Inoculation of Yellow Fever Vaccine *Bull U S Army Med Dept* 1944 May No 76 115-20

Forty horses were inoculated with yellow fever vaccine from lots which were associated with the occurrence of jaundice in man. Ten horses received vaccine which had not been icterogenic to man. Four horses were given human plasma and serum which also may have produced jaundice in man. No disease resulted which could be compared to the human disease known variously as catarrhal jaundice, epidemic hepatitis, infectious jaundice and postvaccinal hepatitis. Yellow fever virus was not detected in the serum of horses following subcutaneous inoculation of vaccine containing living virus.

DENGUE AND SANDFLY FEVER

STEWART F H Dengue Analysis of the Clinical Syndrome at a South Pacific Advance Base *U S Nav Med Bull* 1944 June v 42 No 6 1233-40 4 coloured figs on 2 pls & 1 chart

In a South Pacific island 25 per cent of the military population were attacked by dengue and 80 000 man power days were lost.

The author describes the signs and symptoms observed in about 300 cases. The incidence of some of these is stated to have been as follows: the figure in brackets are percentages. Sudden onset (78), frontal headache (88), chilly feeling (51), true chill (9), pain in the eyes (69), redness of the conjunctivae (94), low backache (70), pain on movement of eyes (25), palpable spleen (10), gastro-intestinal disturbances (17), rash A (35), rash B (18), saddle temperature (25), cervical lymph nodes (75).

Rash A is described as an evanescent toxic type of rash which appears on the third to the fifth day. It is morbilliform and suggestive of rubella or it may be a diffuse scarlet redness of the chest, shoulders

and arms. Rash B when it occurs is much more characteristic. It usually appears on the seventh day, very rarely before the fifth. It resembles a shower of petechiae and is most abundant on the outsides of the feet but may extend to the legs or even to the thighs. It may be preceded by distressing pruritus.

The saddle temperature is described as being one with high fever at both ends. It may not touch normal between these two spells of fever. Sometimes there was a single spell of fever lasting four days. The duration of the febrile state did not exceed seven days. An irregular spike fever curve was sometimes seen. [The fever curve may have been modified by acetylsalicylic acid which was given as a routine to patients with severe pain.]

The cervical lymph nodes occurred as a chain of pea sized nodules at the base of the neck over the posterior scalenus muscles.

The blood picture was of the usual type.

Treatment was purely symptomatic. It consisted in reassurance, rest in bed and sedatives. Half a grain of codeine and the usual doses of acetylsalicylic acid at bedtime were needed in most cases.

Four good sketches in colour illustrate the paper.

John W. D. McAuley

STEWART M. A. Dengue Fever. *Proc. & Papers 13th Ann. Conference Cal. for Mosquito Control Ass.* 1944 Feb. 28 & 29 Bk. 1, p. 5-6.

KHODOLKIN N. I., SOSHNIKOVA M. N. & KEVORKOVA V. I. [On the Cultivation of the Virus of Sandfly Fever.] *Zhurnal ikh obshchestvennoy epidemiologii i infektioznoi bolezni* Moscow 1943 No. 10/11 54-9 [In Russian.]

As some authors have suggested that only a few viruses (smallpox, the sarcoma of Rous and a few others) give characteristic changes on the chorio allantoic membrane by the method of Goodpasture and Maitland [*Bulletin of Hygiene* 1935 v. 10 563 1941 v. 16 138] the authors have decided to test the virus of sandfly fever inoculated from infected human beings. This was made possible by the wide use of an infection with sandfly fever for the treatment of some forms of schizophrenia. For the cultivation of the virus a strain from one particular patient was used. Before the experiments the strain was frequently transmitted through patients of the mental hospital and invariably produced typical sandfly fever. All sera were subjected to a Wassermann reaction and were tested for bacterial sterility. The incubation of the serum on the chorio allantoic membrane is described in detail. The histological changes of the membrane were as follows: usually on the 5th day after incubation 2-3 patches with a diameter of 2-3 mm. were noticed. They were of opal white colour, their outlines were smooth and they were mostly oval in shape. They appeared not only at the site of inoculation but also some distance away from it. The non-specific microscopic changes on the membrane which are also obtained with T. solution and with normal serum were observed by the authors. It is noted by others but with some experience these could be distinguished from the patches produced by sandfly fever. Generally speaking the microscopic changes in the membrane of the embryo (rarely of the

entoderm) and a reaction of the mesoderm. The appearance of papillomata was attributed to the non specific process. The formation of pearls, ulcers etc. was due to trauma and was hardly seen when Goodpasture's technique was accurately performed. The best criterion of successful culture of the virus on the chorio allantoic membrane is the pathogenesis of the culture to man. Only 36.7 per cent of inoculated eggs produced visible macroscopic changes. This indicates that the chorio allantoic membrane is probably not the most suitable medium for the virus of the sandfly fever. *H W Swann*

KHODUKIN N I & SHTERN-GOLD E J [Further Study of Experimental Sandfly Fever in Animals] *Zhurnal mikrobiologii, epidemiologii i immunobiologii* Moscow 1943 No 10/11 60-62 [In Russian]

Having previously had successful results from infecting rabbits and dogs with the virus of sandfly fever the authors compared two methods of infection. (1) The intracerebellar (Utenkov) and (2) The intracisternal by suboccipital puncture. Only one rabbit reacted slightly. The authors came to the conclusion that the intracerebellar method was not successful and that the virus did not survive in the brain of rabbits. The authors also tried the intracerebral method on white mice and found that these animals were not susceptible to the virus of sandfly fever. The methods were then tried on two monkeys but the results were unconvincing and the blood of the monkeys which was injected into five mice and two schizophrenic patients intracerebrally gave negative results. SHORT POOLE and STEPHENS [this *Bulletin* 1935 v 32 171] were the only workers who obtained positive results by infecting monkeys with the virus of sandfly fever. Their animals showed a definite and characteristic temperature with a definite incubation period (3-3½ days). What is more important they were able to infect healthy monkeys and men by injecting into them the blood of the sick monkeys.

Suboccipital injection of rabbits with the virus of sandfly fever so far remains the only successful method. *H W Swann*

PLAGUE

PALESTINE DEPT OF HEALTH ANN REP FOR YEAR 1942 13-17
1 map Plague

In Northern Palestine there were five cases of plague in 1942 three were infected in Haifa where 0.3 per cent of 9750 rats were found to be infected. Of the rats 19 per cent were *R. rattus* of the fleas 80 per cent were *Xenopsylla cheopis*. Control measures similar to those previously reported [this *Bulletin* 1943 v 40 538] are being continued and the epizootic is apparently diminishing.

In Jafia in the winter of 1942-43 there were 15 cases of plague nine of which were fatal. 88 infected rats were found in 3860 examined. *Rattus rattus* accounted for only 1.5 per cent of the rats. *Y. cheopis* for 38 per cent of the fleas. Rat destruction was undertaken and 16800 persons were inoculated with Haffkine's vaccine. Many shacks were demolished and rubbish heaps cleared. *Charles Wilcocks*

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KALLAT S Recent Experiences in the Symptomatology and Treatment of Plague *Indian Med Ga* 1944 Apr v 79 No 4 168-9

This account relates to an outbreak of plague which involves 290 cases. One or other of the sulphonamides was used in treatment with somewhat disappointing results for the mortality was 42 per cent. It is conjectured that this result was due to the lateness of the treatment.

W F Harley

PFRYASSO A G O combate ao rato [The Anti rat Campaign] *Jolha Med* 1944 Mar 5 v 25 No 5 33-7

The account here given is good, detailed and follows the usual lines in describing how to get rid of the danger of the plague rat. A short reference is made to the history of invasion of Brazil by plague and the bionomics of plague are considered by way of introduction. Other headings are: the damage done by rats; species of rats; and details of the rat destruction campaign.

Poison bait formulae are given, all of which use arsenic with a common base of wheat flour or manioc and different mixtures of flesh, fish or blood. Insistence is made on the necessity of ringing the changes on different baits because in time rats become wary and the baits set for them ineffectual. The arsenic preferably commercial arsenic is present in 15 per cent strength. Other poisons which may be used are barium carbonate and red squill. One of the advantages of the arsenic bait is that the rat after dying undergoes mummification.

W F Harley

BACILLARY DYSENTERY

BULL U S ARMY MED DEPT 1944 Apr No 75 3-4 Toxic Reactions of Sulfaguanidine Therapy

Sulphaguanidine was used to treat 191 ambulatory carriers of the Flexner W type of dysentery bacilli; the dosage was 3.5 gm. three times a day for 10 days, the total amount given being 105 gm. The patients were soldiers on duty (light where possible) in a tropical island. The treatment had to be stopped in 11.5 per cent of them owing to the occurrence of severe reaction. Fever developed in 9.4 per cent and subsided within 24 hours after withdrawal of the drug. Intermittent crystalluria was observed in 26.5 per cent of 83 patients whose urine was frequently examined and transient haematuria occurred in four cases. Other reactions were urticaria (3) and scarlatiniform rash (2). About 20 per cent of the patients complained of such symptoms as headache, backache and nausea. The authors suggest that the loss of fluid by perspiration in the tropical climate was a contributing factor in the development of these reactions. [See also *Bulletin of War Medicine* 1943 Mar v 3 No 7 407; *ibid* 1944 July v 4 No 11 676.]

J F Corson

- 1 COMPTON A Phage Therapy in Diarrhoea and Dysentery [Correspondence] *Lancet* 1944 Aug 5 192-3
- 11 BOYD J S K Bacteriophage in Bacillary Dysentery [Correspondence] *Ibid* Oct 7 486

1 Referring to an annotation in the *Lancet* of June 3rd 1944 on a paper by BOYD and PORTNOY [this *Bulletin* 1944 v 41 569] the author states that the German bacteriophage used by them for the treatment of German prisoners of war in North Africa was tested by him in 1935 and in 1942. On the first occasion he reported that the phage was ineffective against 42 per cent of the dysentery organisms commonly met with in Alexandria and was inferior to a phage made in Paris tested at the same time. In 1942 he reported that the German phage appeared to be only moderately rich in anti dysentery elements and almost devoid of co dysentery activity.

He refers to Salmonella and coliform organisms as co dysentery elements and considers that for phage treatment to be of any therapeutic value it must be effective against these organisms as well as against the classical organisms of dysentery. He therefore gives a good dysentery and meta dysentery phage preparation alternately with a good Salmonella and coliform phage preparation [see this *Bulletin* 1942 v 39 36] and thinks that if Boyd and Portnoy had treated their patients with such preparations their results would have been different. [See also this *Bulletin* 1943 v 40 845]

11 Boyd states that in their paper he and PORTNOY showed that the bacteriophage used by them was superior both to Bacti dysentery phage of the Laboratoire de Bacteriophage Paris and to Anti diarrhoea Polyphage of the Bacteriophage Research Institute of Egypt. He knows of no evidence which incriminates the organisms which COMPTON has somewhat recently come to regard as important concomitants in dysentery but agrees that a phage preparation which covers only the classical organisms is ineffective.

J F Corson

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

RATCLIFFE H L & PARKINS Phyllis V On the Use of Mallory's Phosphotungstic Acid Hematoxylin for staining Intestinal Protozoa
J Lab & Clin Med 1944 May v 29 No 5 534-5

The following method of staining intestinal protozoa is simpler than that of Heidenhain with iron haematoxylin and is satisfactory for routine examinations. Fresh specimens of faeces should of course be used.

- 1 Fix smears in Schaudinn's fluid or a modification of it containing 5 per cent of acetic acid for 1-24 hours. Bouin's fluid is not suitable.
- 2 Remove $HgCl_2$ with iodine and the iodine with 70 per cent alcohol in the usual way and wash in water.
- 3 Stain with Mallory's phosphotungstic acid haematoxylin for 20-30 minutes the time being found by trial as it depends on the ripeness of the stain.
- 4 Wash until the smear becomes blue dehydrate slowly in 95 per cent alcohol and then absolute alcohol.

The protoplasm is pale blue and the nuclei a darker blue.

J F Corson

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

RUIZ SÁNCHEZ F. Fiebre recurrente en el Estado de Jalisco [Relapsing Fever in Jalisco State Mexico] *Medicina Mexico* 1944 June 10 v 24 No 461 199-203 2 figs

The author believes the case recorded here to be the first published in the State of Jalisco. The patient was a man of 23 years in excellent health when he was sent with others to the north west of the State to fetch some bull for bull fighting. He made the journey on horseback spending the nights at Jalo totitlan and Encarnacion de Diaz sleeping on the floor of the taverns above the stables and was much bitten by ticks. A week later he felt ill with intense headache pains in the loins and calves and nausea and vomiting, he had shivering attacks and high fever but did not know how high. After five days the symptoms subsided suddenly and for a week he felt well and returned to his work. Seven days later the symptoms returned but lasted for three days only. Having passed through two more relapses each of three days after an afebrile period of a week he went to a doctor for treatment. No spirochaetes were seen on examination of blood smears but inoculation of white rats with 5 cc. of blood gave a positive finding in the rat's blood after a week's incubation. Neosalvarsan two doses of 0.3 gm. at a three day interval was given the symptoms subsided and did not recur. Ticks were obtained from Jalostotitlan and Encarnación de Diaz. They proved to be *Ornithodoros turicata* and several of those from the latter place were found to be infective none was found among those from Jalostotitlan. Further study is suggested to determine the extent of the district infected. *H. Harold Scott*

EAGLE H & MAGNUSON H J with the technical assistance of Arlyne D MUSSELMAN. The Therapeutic Efficacy of Penicillin in Relapsing Fever Infections in Mice and Rats. *Pub Health Rep Wash* 1944 May 5 v 59 No 18 583-8

The authors have tested the effect of penicillin on infections with a virulent strain of *Spirochaeta* in both rats and mice. The results are given in tabular form and show that in white rats to cure 50 per cent of the animals approximately 130 000 units per kilo body weight were required and to cure 95 per cent a dose of 400 000 units per kilo. The latter approached the toxic level of the commercial penicillin employed. In white mice approximately 100 000 units per kilo were necessary to cure 50 per cent.

These results indicate that the curative dose of penicillin in man could be of the order of 25 000 000 units and unless relapsing fever in man is more amenable to treatment than in experimental animal the therapeutic use of the drug would not seem warranted except in arsenic resistant cases [but see this *Bulletin* 1944 v 41 293 759].

E. H. Hildebrand

WITZBERGER C M & COHEN H G. Rat Bite Fever. Comparison of the Spirochetal (Sodoku) and Bacillary (Haverhill Fever) Forms. *Arch Pediatrics* 1944 Mar v 61 No 3 123-33 [27 refs]

The authors have seen seven cases of rat bite fever in New York City during the past few years and give a discussion of the two clinical syndromes encountered one caused by *Spirillum minus* and referred to as sodoku and the other caused by *Streptobacillus moniliformis* and known as Haverhill fever. [See this *Bulletin* 1942 v 39 693]

Each form of rat bite fever is separately discussed as to aetiology, clinical picture, laboratory findings, treatment etc. and a case of each variety is described in detail. The following table gives a comparison of the two syndromes which may serve as an aid in differential diagnosis.

Comparison of the Two Syndromes as an Aid in Differential Diagnosis

	Sodoku	Haverhill Fever
(1) Causative organism	<i>Spirochaeta morsus muris</i>	<i>Streptobacillus moniliformis</i>
(2) Transmission	Bite of rat occasionally other animals	Bite of rat or other animal. Possibly contaminated food.
(3) Incubation period	5 to 30 days. Average 13 days.	2 to 10 days. Average 5 days.
(4) Wound from bite	Apparent healing followed by chancre like ulceration.	Heals promptly without subsequent induration or exacerbation.
(5) Lymph glands	Regional lymphadenitis.	Not involved.
(6) Systemic manifestations	(a) Regularly relapsing type of fever.	(a) Intermittent but not regularly relapsing type of fever.
	(b) Generalized maculopapular rash.	(b) Macular and petechial eruption.
	(c) Varying degrees of prostration and debility.	(c) Varying degrees of prostration.
	(d) Arthritis very rare.	(d) Metastatic arthritis is common.
(7) Laboratory findings	(a) Polymorphonuclear leucocytosis.	(a) Same.
	(b) Secondary anaemia.	(b) Same.
	(c) Widal tests usually positive.	(c) Negative.
	(d) Isolation of spirochaete by animal inoculation of blood or infected lymph gland material.	(d) Isolation of <i>Streptobacillus moniliformis</i> by blood culture on veal infusion broth enriched with rabbit serum.
	(e) Agglutination tests negative.	(e) Agglutination test with <i>Streptobacillus</i> positive. Serum from patients agglutinates a polyvalent antiserum of the organism.
(8) Treatment	Responds to treatment with arsenicals.	Arsenicals of little or no value. Sulphonamides may be indicated.

E. Hindle

HITZIG W. M. & LIEBESMAN Ada. Subacute Endocarditis associated with Infection with a *Spirillum*. Report of a Case, with Repeated Isolation of the Organism from the Blood. *Arch. Intern. Med.* 1944 May 1, 73 No. 5, 415-24. 3 figs. [Refs. in footnotes.]

A detailed account of a fatal case of subacute endocarditis associated with infection with *Spirillum minus* which was isolated from the blood

on six occasions extending over nearly 10 weeks and cultured in dextrose and tomato bouillon in an atmosphere containing 30 per cent CO_2 . The nature of the organism was established by its morphology and also by its pathological and serological characters. Reference is made to a spirillum *S. surati* isolated from the blood of a case of subacute endocarditis by LAMB and PATON [Arch Int Med 1913 v 12 259], but its cultural and serological reactions are shown to be quite distinct from those of the organism isolated by the authors.

The main interest of this case lies in the close resemblance of the clinical course and changes observed at autopsy to those observed in cases of the common form of subacute bacterial endocarditis due to *Streptococcus viridans* E Hindle

CORGER M & BOYER F. Chimiotherapie du sodoku experimental du cobaye par le sulfamide et ses derives [The Chemotherapy of Experimental Sodoku in the Guinea-pig by Sulphonamide and its Derivatives], Ann Inst Pasteur 1944 Mar-Apr v 70 No 3-4 119-24 2 figs

The authors mention that in a previous communication with VITTI reference not given they had shown that it was possible to treat guinea-pigs infected with sodoku by means of subcutaneous implantation of fragments of sulphathiazole. The dose was 1 to 2 gm per kilo body weight administered two or three times at intervals of 6 or 8 days. The authors now find that it is much more satisfactory to give the drug by mouth as with the first method certain animals died under the treatment.

It is noted that in testing the effect of treatment it is preferable to use a virulent strain of the spirillum inoculated intradermally and adult guinea-pigs which give a better symptomatology. Under these circumstances a chancre appears at the site of the inoculation after an incubation period of three to four days which reaches its maximum development at the end of the week. During the next week spirilla appear in the blood but show marked daily variations in the numbers present. From the beginning of the third week various trophic disturbances appear and the animal dies between the 30th and 40th days of the disease.

Treatment by means of 116°F (sulphathiazole) administered daily by mouth in doses of 0.5 gm per kilo body weight was found to cure every animal treated even if the treatment was not begun until late in the infection—towards the 30th day. The spirilla disappeared from the blood within five or six days and the general symptoms subsided. The treatment was also successful in the case of animals in extremis.

When the dose was reduced to 0.1-0.2 gm per kilo body weight treatment was successful in preventing infection if it was begun on the same day as the inoculation of the spirilla but did not cure animals in which the disease had developed. Attempts were then made with allied compounds which are eliminated more slowly from the body and it was found that daily doses of 0.1 gm sulphathiazole or of sulphapyridine for 12 days cured animals up to the 20th day of the disease.

The treatment in nearly every case was accompanied by a sharp rise in the number of spirilla in the blood about the second day, lasting for 24 to 48 hours after which the number rapidly diminished. In some

cases there was a secondary rise two or three days later. The body weight of the guineapigs showed a constant diminution during the first few days of treatment followed by a steady increase after about a week.

E Handle

HELMINTHIASIS

OTTOLINA C & ATENCIO M H Nuevos caminos para el diagnostico clinico preciso de la schistosomiasis Mansonii [New Methods for the Exact Clinical Diagnosis of Schistosomiasis caused by *Schistosoma mansonii*] *Rev Policlínica Caracas* 1943 Nov Dec v 12 No 73 348-80 2 figs [18 refs]

The authors discuss the reason why they are not satisfied with current methods of diagnosis of this disease. They review the work of earlier authors on its incidence in Venezuela and Egypt and conclude that the methods used in Venezuela fail to diagnose clinically 11 to 18 out of every 20 cases. This failure is the more serious because the methods used are employed by experts whose figures of the incidence presumably represent the highest percentages obtainable by these methods. After a discussion of the limitations of the complement fixation reaction the authors discuss the use of biopsies of liver parenchyma and of tissue taken from the rectal ampulla.

Biopsy of the liver was tried after examination of bile removed by duodenal incubation of 33 patients in whose faeces eggs of *S. mansonii* had been found had revealed these eggs in two only. The authors concluded that the examination of extrahepatic bile was useless for diagnosis. A technique was then developed at autopsies for removal of small samples of liver tissue and their digestion by Fergusson's method (*Glasgow Medical J* 1935 v 79 14-23) in 4 per cent KOH at 60-80 C. The final procedure adopted by the present authors was to put three drops of 4 per cent KOH into a centrifuge tube and to add to this the piece of liver tissue removed by means of a trochar and syringe. This fluid was then warmed on a spirit lamp and after 3-5 minutes the liver fragment was digested. The digest can then be centrifuged and the deposit examined for eggs of *S. mansonii*. The pieces of liver can also be examined by tearing up in saline or by clearing in lactophenol. Out of 40 livers examined thus by digestion at autopsy 18 (45 per cent) contained the eggs. Relating this figure to published figures of the incidence the authors conclude that 25 out of each 45 cases are not diagnosed at autopsy by current methods.

This procedure was then tried on living patients in whose faeces eggs of *S. mansonii* had been found. Out of 16 such patients liver material could only be obtained from 9 but all these contained eggs of *S. mansonii*. There was however a serious risk of haemorrhage although the authors did not experience this in any of their cases. They therefore sought another method and tried biopsy of the rectum.

The method was first tested at autopsies. Pieces of the rectal ampulla put into 10-15 cc of KOH at 60-80 C were digested in 4-1 hour. Of 25 such specimens eggs were found in 15 (60 per cent) often in extraordinary numbers. The results showed that the rectum contained eggs more often than the liver and that they were never absent from the rectum when they were present in the liver. The bearing of these

results on views about the incidence of infestations which have become inactive is discussed. The view of the authors is that the rectum and sigmoid are more often infested than the liver.

On living patients the authors performed rectoscopy and biopsy of a fragment of the free border of the upper half of the rectal ampulla (coccygeal-sacral fold) of the size of a grain of rice. Their technique is described. A piece of tissue the size of a grain of rice was removed and distilled in KOH. For these examinations sanatorium patients were used whose better social status had exposed them less to infestation. Some came from regions where bilharzia is not recorded. Previous faecal examination of 19% of them had revealed eggs in the faeces of 19 (9.89 per cent). Rectal biopsy was done on 12 of these positive cases. No treatment had been given to 8 and the biopsies on all of these were positive. One had been treated but was still positive by faecal examination and the biopsy was also positive. The others were regarded as clinically cured on the basis of successive faecal examinations after one or two courses of tartar emetic but the biopsies on both were positive. One biopsy only was negative and this was in a clinically cured patient who had had three courses of foudrin. It was thus evident that one or two courses of treatment with tartar emetic controlled by routine faecal examinations were not sufficient evidence of a cure. Biopsy moreover took only a few hours while faecal examinations might have to extend over several months.

Biopsy of the rectal ampulla was also done on 100 sanatorium patients whose faecal examination were negative. Biopsy of 11 of these (11 per cent) revealed the presence of eggs of *S. mansoni*. Multiple or successive biopsies of different parts of the upper half of the rectal ampulla would the authors suggest increase the incidence figures still more. Biopsy could supplement skin and complement fixation tests. The paper itself must be consulted for the authors' discussion of incidence figures obtained at autopsy or otherwise and their relation to their own findings by liver or rectal biopsy.

G Lapage

Dr Prieto J. Nota preliminar sobre posibles dermatosis de origen bilharziano y su diagnóstico por la prueba cutánea de la bilharzina.
Preliminary Note on possible Dermatoses of Bilharzial Origin and their Diagnosis by a Cutaneous Test with Bilharzial Antigen.]
Rev. Sanidad y Asistencia Social Caracas 1943 Oct v 8
No. 1067 12

The author deals with certain cutaneous syndromes distinct from cercarial dermatitis or the nodular erythemas which have been ascribed to bilharzial infestation. These are described as —

1. *Neurodermatitis* which is the most frequent. The patient shows one or more plaques of lichenification sometimes circumscribed by a well-defined border sometimes diffuse or occasionally generalized. These plaques are erythematous. Their surface is glossy hyperpigmented and divided into squares by the crossing of numerous sulci. The condition may resemble lichen planus. The plaques are chiefly found on the dorsum of the foot in the popliteal space on the flexor surface of the elbow or at the nape of the neck. Biopsy has shown in some cases a rich eosinophile infiltration.
2. A type called *chronic prurigo* characterized by a papular eruption which occurs especially on the extensor surfaces of the limbs and is very pruriginous. The eruption usually occurs on a thickened skin.

3 A non purulent pruritus without any discoverable cause (i.e. without diabetes gout hypocalcaemia endocrine factors alimentary or respiratory allergy neuroses etc.) But the bilharzial reaction is positive in these and sometimes eggs of *Schistosoma* are found in the faeces

Dr P GUERRA suspected that all these might be bilharzial and the author discusses this view. It is necessary, he says, not to draw hasty conclusions from the insufficient facts available and he comes to no conclusion himself but he gives the following observations —

Intradermal tests were done after consultation with Prof M MAYER with antigen prepared by Mayer's technique from adult *Schistosoma*. It was recognized that allergic reactions due to factors other than the presence of *Schistosoma* might be obtained. These intradermal tests were done on 112 patients who were not selected. Of these 53 (47.3 per cent) were positive and 59 (52.6 per cent) were negative. Of the 59 negatives 7 only had been diagnosed as prurigo or lichenification, the rest having asthma urticaria etc. Of the 53 positives 27 (50.9 per cent) had been diagnosed as prurigo or lichenification. None of the 59 patients negative to the intradermal tests had eggs of *S. mansoni* in the faeces but these eggs were found in the faeces of 16 out of 39 of the patients giving a positive intradermal test (the faeces of 14 of these could not be examined). The Fairley complement fixation test was done on three of the patients positive to the intradermal test and it was positive in all three. In an attempt to differentiate between bilharzial and other allergic reactions the patients positive to the intradermal test were divided into group A who were not positive to any other allergic test (alimentary or respiratory allergies) tried and group B who were. Antibilharzial treatment given to group A improved many and cured a few but the same treatment given to group B gave inconclusive results. Asthmatic patients were seen in whom the only positive skin test was the one done with bilharzial antigen. antibilharzial treatment improved these

G Lapage

CAWSTON F G Propamidine in Bilharziasis *South African Med J* 1944 July 8 v 18 No 13 228-9

Propamidine was tried in a few cases of urinary schistosomiasis in South Africa. Courses of injections i.m. or i.v. with a total dosage varying from 0.6 gm (children) to 1.7 gm were given during periods of 11 to 30 days. Intramuscular injections produced induration of the arm muscles and results could not be judged in some of the cases. In two Indian youths who received a total dosage of 1 gm in about 10 intravenous injections during 30 days living ova were still present in the urine at the end of the course. The injections caused syncope. In an African patient the urine became free from ova and red blood corpuscles after 11 intravenous injections of 0.15 gm. The author remarks that the drug is much more useful in staphylococcal infections of the skin and nasal cavity

J F Gorson

MACFARLANE W V Schistosome Dermatitis in the Southern Lakes An Investigation of Swimmers Itch *New Zealand Med J* 1944 June v 43 No 235 136-40 5 figs [11 refs]

Swimmers itch has long been known to follow bathing in certain New Zealand lakes as in many other countries. That due to bathing

At Lake Wanaka was investigated and three types of lesions were observed and were reproduced in experiments on volunteers. In persons who had not had previous attacks itching began from 10 to 15 minutes after leaving the water. In some persons macules 2 mm in diameter appeared after 1 hour and disappeared in six hours but in others there was no visible lesion. In persons who had been attacked before itching and macules also appeared but the macules became papules in 10 hours and some developed into red weal. The third type of lesion—itching macules and pruritic oedema—appeared in one person. In experiments on volunteers it appeared that in persons not previously attacked only macules developed while papules were formed in those previously attacked. Some evidence of immunity was obtained. It was local in areas of thick skin and a general immunity was shown by some persons who had never been infested.

The life history of the parasite is similar to that of *Schistosoma arguta* and *Limnata alfredi*. They vary in length up to 0.8 cm and have large fleshy feet and friable shells. A photograph shows dextral helices. The vertebrate hosts are probably ducks.

The cercaria is fork-tailed and has the following dimensions of length: body 300–344 μ , tail 446–527 μ , tail fork 244–267 μ . There are 5 pairs of posterior enzyme-secreting glands used for lysis of the epidermis of the vertebrate host and 1 pair of anterior glands used for escape from the snail. The cercaria has a ventral sucker, a primitive nerve-mass and a pair of eye spots, a set of flame cells, an excretory vesicle and ducts discharging at the tips of the tail. It is closely related to *C. ocellata* and *C. eliae* but appears to be a new species and is named *C. longicauda*.

In an experiment on a volunteer it was observed that the body of the cercaria penetrated the skin in about 5 minutes, the tail being broken off outside by a convulsive movement. The itching begins as the cercaria digests a track through the malpighian layer. Biopsy after 24 hours showed the parasite in a burrow in the epidermis. The prickly cells were lysed and compressed and the parasites were beginning to undergo lysis. In the dermis there were oedema and polymorpho-nuclear and lymphocytic infiltration. After 75 hours there was no trace of cercariae. The burrows do not pass into the dermis. No eosinophil leucocytes were seen.

Cercarial antigen was prepared from the bodies of cercariae preserved in merthiolate and 0.1 cc was injected intradermally into 11 infested and 10 uninfested persons. The latter did not react but the former showed a slight immediate and a much more marked delayed reaction. This appeared as an itching erythematous area 1 cm in diameter 8 hours after the injection and consisted of a central red spot surrounded by a pink tender areola and a peripheral zone of vasoconstriction. In recently infested subjects it was 3 cm in diameter and lasted 7 days, in a person infested 5 years before it was 1 cm in diameter and lasted for 2 days only while no reaction occurred in a person infested 10 years previously. Heterologous antigen prepared from *Gorgoderia* sp. adults caused a similar but smaller reaction in infested but not in uninfested subjects. The papules are probably an allergic reaction and the weals further responses to protein or polysaccharide liberated from the cercaria.

The snails live chiefly in the beds of pondweed (*Myriophylla* sp.) in less than 10 feet of water. Until the snails can be eradicated

possibly with copper salts people should avoid bathing there [Other cercariae incriminated and references in this *Bulletin* are *C. eliae* v 25 946 v 27 459 v 38 378 and 379 *C. ocellata* v 27 960 v 29 48 *C. pathloclopticum* v 21 206 v 39 769 *C. physellae* v 38 44 and 379 *C. spindale* v 36 40 *C. stagnicolae* v 38 44 378 and 379 *C. utrina* v 27 960 *C. tuckerensis* v 34 392 cercaria of *S. hematobium* v 34 392 *C. douthitti* see PRICE *Amer J Hyg* 1931 v 13 685] J F Corson

ARCHIVOS INTERNACIONALES DE LA HIDATIDOSIS Montevideo
[International Archives of Hydatid Disease] 1941 Dec v 5 No 1-2 680 pp Numerous illustrations

This volume contains a paper on the intradermal test in hydatid disease by CASONI one on the incidence of the disease in the United States and Canada by MAGATH [see also this *Bulletin* 1937 v 34 401] who states that between 1808 and 1938 there have been records of only 501 cases in the two countries In another paper PINTO and LINS DE ALMEIDA report on the incidence in Brazil Most of the contributions deal with clinical aspects of the disease but there is a considerable section of 7 papers in which biological problems are considered Charles Wilcocks

RIVAS C I Hidatidosis y tuberculosis pulmonar [Hydatid Disease and Pulmonary Tuberculosis] *Rev Asoc Med Argentina* 1944 May 30 v 58 No 534 331-6 17 figs

BAILEY W C A Study of the Incidence and Treatment of Intestinal Parasites in South-eastern Kentucky *Southern Med J* 1944 July v 37 No 7 407-9

The commonest worm in children was *Ascaris lumbricoides* in adults *Trichuris trichiura* and *Necator americanus*

MACGREGOR G A Sternal Puncture in Hypochromic Anaemia resulting from Ankylostomiasis *East African Med J* 1944 May v 21 No 5 134-43

The sternal puncture and peripheral blood findings of 16 cases of severe anaemia associated with ankylostomiasis are discussed The author describes the anaemia as hypochromic but in many cases the colour index was above 0.8 which is unlike classical hypochromic anaemia Unfortunately, no measurements of cell size were made He describes the marrow picture as showing a definite percentage increase in the incidence of both early and late erythroblasts and a definite swing to the left in the process of maturation of the erythrocyte again a finding which is unlike that of the hypochromic anaemias studied in other countries Both the peripheral blood and marrow picture suggest that there is probably a dual deficiency present namely of iron and possibly of the anti-pernicious anaemia factor Analysis of the diet of the patients studied showed it to be extremely poor in iron in protein and in any source of the anti-pernicious anaemia factor The remarkable improvement seen in patients when massive iron therapy was augmented by intramuscular liver extracts tends to support this hypothesis [Though the observations described are incomplete in certain respects this paper is valuable because it emphasizes the extreme importance of anaemia due to a combination of ankylostomiasis and dietary

deficiencies in African natives. Anaemia of such severity must inevitably reduce their capacity for work almost to zero. The observations tend to support the findings of NAPIER *et al* (this Bulletin 1942 v 39 100) and ANDREWS (*ibid* 712) that hookworm infection does not produce severe anaemia unless there is also a dietary deficiency.]

Janet Ian han

LOWE T E & LANCASTER H O Hookworm Infestation. *Med J Australia* 1944 Apr 1 v 1 No 14 289-92

The authors studied 386 soldiers who had returned from service in the island north of Australia with mild infections with *Ancylostoma duodenale*, *A. brahense* and *Necator americanus*. Most of them also had malaria. Reliable information about skin lesions such as ground itch or creeping eruption could not be obtained because most of the patients had skin lesions due to fungi and other agents. One-third of the patients had flatulent dyspepsia but similar symptoms were found in other patients in whom evidence of helminth infestation could not be found. The haemoglobin was estimated and the number of red blood cells counted in 700 consecutive patients on the third day after treatment for malaria and these data were compared with others obtained from 100 patients with malaria but without evidence of helminth infestations. The authors conclude that the malaria and not the hookworms caused the fall in haemoglobin found (the average haemoglobin level was 80 per cent). The only blood change due to the hookworm was the thick pronounced absolute eosinophilia. The maximum number of eosinophils per cmm recorded was 12,000 per cmm and the maximum percentage 80 per cent. Averages were 1,800 eosinophils per cmm and 14 per cent. The authors think that the absolute counts are alone useful for diagnosis. The number of eosinophils fell rapidly 24-36 hours before a malarial fever and did not again reach their maximum until 14 days after it. The Willis concentration technique was used for diagnosis and usually only one specimen of faeces was taken from each patient so that the authors think that they may have missed many cases. In differential diagnosis the eosinophilia is the main problem. Of the patients with recurring malaria 11 per cent had an eosinophilia of 500-1,500 cells per cmm. Of all the subjects with more than 500 eosinophils per cmm 144 had no evidence after two faecal examinations of helminth infestations. Thirty-nine showed helminth infestation after repeated examinations in 19 the eosinophilia disappeared after anthelmintic treatment in 61 it was adjudged to be due to the malaria and in 25 it was an unexplained eosinophilia of 2,000 or more per cmm without evidence of the presence of protozoa or helminths although all these patients had recurring malaria.

For treatment the authors used hexylresorcinol (15 grains), carbon tetrachloride (3 cc), oil of chenopodium (2 cc), tetrachlorethylene (4 cc) and mixtures of oil of chenopodium (1 cc) with either carbon tetrachloride (3 cc) or tetrachlorethylene (4 cc). The most effective drug used alone was tetrachlorethylene but the mixtures of this with oil of chenopodium and of chenopodium with carbon tetrachloride were equally effective. The stools of 60 per cent of the subjects were free of eggs five to seven days after a single dose of (unspecified) anthelmintic and repeated doses freed the stools in 80 per cent of cases. But eggs were found three weeks after dosing in some cases and the authors give as a criterion of cure the absence of eggs after three examinations.

at intervals of one week. The total number of doses of carbon tetrachloride given was 317. In two patients there was mild jaundice and in two others upper abdominal pain on the right side and tenderness over the liver without jaundice. Tetrachlorethylene consistently caused pronounced muscular incoordination. The authors conclude that these symptoms show that the doses they gave were the maximum ones that can be given with safety.

G Lapage

MAPLESTONE P A Hookworm Infestation [Correspondence]
Med J Australia 1944 Apr 22 v 1 No 17 379-80

The writer of this letter points out that the relative values of heavy resorcinol oil of chenopodium carbon tetrachloride and tetrachlorethylene have been established for many years as the result of the work of numerous investigators whose conclusions are based on many thousands of treatments and that LANCASTER and LOWE [above] do not refer to any of this work. He thinks there is a danger that the brief statement by these authors on the toxic effects of the drugs which they used may be taken as a full statement of the position. Lancaster and Lowe do not comment on the evidence which they found in four of their patients of liver damage (jaundice and pain and tenderness in the hepatic region) and do not describe any treatment of these symptoms nor do they seem to be aware of their grave import. They merely conclude on their evidence that the 3 cc of carbon tetrachloride given by them as the maximum safe dose. Maplestone emphasizes that carbon tetrachloride is a dangerous drug and that its toxicity is largely independent of the size of the dose. There is a record of death after only 1.5 cc. All the evidence goes to show that it invariably causes liver damage whether there is clinical evidence of this or not. It has been superseded by tetrachlorethylene which has approximately the same anthelmintic value against hookworms but does not cause liver damage. No deaths have yet been ascribed to tetrachlorethylene though there is at least one record of deep narcosis resembling chloroform anaesthesia and lasting two hours or longer so that it is necessary to keep patients who are given tetrachlorethylene under observation for some hours. [Most recent editions of text books on pharmacology and tropical medicine point out the contraindications to giving carbon tetrachloride and discuss the possibility of individual idiosyncrasy to it and the precautions which must be taken in its use.]

G Lapage

LOWE T E & LANCASTER H O Strongyloidiasis in Man Infestation with *Strongyloides stercoralis* (Bavay 1876) *Med J Australia* 1944 May 13 v 1 No 20 429-30 [13 refs]

In the Australian area strongyloidiasis is reported from New Caledonia the New Hebrides New Guinea and the East Indies generally and from the coastal belt of Queensland. HEYDON and GREEN (Med J Australia 1931 v 1 619) found an incidence of 0.03 per cent among whites on the Atherton Tableland and think the few earlier surveys made in Australia were inaccurate because of contamination of faeces with coprophile nematodes. Two records are quoted of the incidence of strongyloidiasis outside the tropical zone of Australia. It is likely that Australian troops will be infested and that the disease will become of clinical importance. The life history of

Strongylides stercoralis and the pathological changes caused by the larvae and adults are described. Several fatal cases have been reported by FALTY and DE CROAT (this Bulletin 1941 38 118 and by OPHILS (1930 1 27 979. Lowe and Lancaster studied 16 cases in a military hospital of these 14 had served in New Guinea 2 had never left the Australian mainland. Thirteen of them also had malaria hookworm or other nematode infestations and other ailments but when these conditions had responded to treatment the effects of *Strongylides* could be observed. The patients had been in the tropics for only a few months so that the disease was in its early stages in all. The symptoms were chronic colic (due to larvae in the lungs) dyspepsia and chronic diarrhoea (due to adult parasites burrowing into the intestinal submucosa). There was no anaemia. The only leucocyte change was eosinophilia. The leucocyte raised from 9 000 to 30 000 per cmm the number of eosinophils from 1 100 to 12 600 per cmm with an average maximum of 4 300 per cmm. In the eight cases without other helminths the range was from 1 100 to 3 300 with an average of 2 500. One patient had a persistent eosinophilia of 800 cells per cmm which increased after ten days to 3 300 per cmm and eight days later larvae of *Strongylides* were found in the faeces. The eosinophilia is not diagnostic. The adult worms or their larvae must be found in the faeces. Larvae may be found by culture of 1 oz. of faeces mixed with 1 oz. of boiled garden soil in a jar in a warm dark place. After ten days the mouth of the jar is covered with gauze and inverted into a Baermann apparatus. The larvae may be seen with the naked eye migrating from the culture into the warm water in the Baermann funnel or may be drawn off after one hour from the rubber tube below. The rhabditoid larvae of *Strongylides* may be distinguished in such culture from the rhabditoid larvae of hookworms and the pseudorhabditoid larvae of *Trichostrongylus*.

Gertjan (1944) reported results for treatment although it usually relieved the symptoms. Only one patient showed return of the eosinophil count to normal and the three successive negative faecal examinations which were taken as the criterion of cure. One patient showed the three successive negative cultures but had 7 040 eosinophils per cmm at the end of treatment. Fouadin tartar emetic and emetine hydrochloride all failed to affect the stages of the worms in the tissues. Problems of hygiene are similar to those which apply to hookworm. Cf LEVIN (this Bulletin 1944 41 411 and SHIMONOBU and EMENO (1944) who obtained similar results with guinea pigs and suggest as these authors also do that a more serious study of trichostrongylosis is required. G. L. A. C.

BRUNNER M. ALTIAN I. BOWMAN Katherine Canine Sensitivity to Aescin Antigen J. Allergy 1944 Jan 15 No 1 2-8

In a paper on spontaneous allergy in low r animals WITTICH (J. Allergy 1941 1 247) reported the case of a dog showing typical symptoms of ragweed hay fever. Cutaneous tests with ragweed antigen were positive and were followed by a systemic reaction and shock from which the dog recovered after an injection of adrenalin. Wittich suggested the possibility of spontaneous development of atopy in the dog. BRUNNER (J. Allergy 1934 3 257) has shown that *Aescia* antigen can produce reagin in man. In the present paper the

authors investigate whether *Ascaris* would produce in dogs skin sensitizing antibodies with characteristics similar to the atopic reagins which *Ascaris* antigen produced in man [Throughout the paper the generic and specific names of the Ascaroidea referred to are not stated]

Intracutaneous tests (on the abdomen) were first done on 24 dogs aged 2 months with dog and pig *Ascaris* antigens. The cutaneous reactions were negative to both antigens in two of these dogs aged 2 to 7 months in two others aged 3 and 4 months the reactions with dog *Ascaris* antigen were negative while those with pig *Ascaris* antigen were positive (one plus). In 10 of the 24 dogs there were positive reactions to both antigens. Hookworms *Ascaris* and whipworms were recovered from six of the dogs which gave positive reactions to both antigens. No nematode infestation was found in four others positive to both antigens but it was known that these four had been treated for a previous nematode infestation. Precipitin tests on six dogs all harbouring nematodes and giving positive cutaneous reactions to both antigens were all negative.

Constitutional reactions (tiredness followed by panting vomiting rapid pulse and marked weakness) followed the skin tests on two dogs positive to both antigens and known to have had previous nematode infestation. One recovered without treatment and the other after the injection of 0.5 cc of 1:1000 adrenalin. Precipitin tests with the sera of these two dogs were negative. With the blood of one of them attempts were made to transfer the skin sensitivity to other dogs and to human beings by the Prausnitz-Kustner technique. This transfer was successful in four out of five dogs and in all the four human beings. The same transfer made with the blood of the other of these two dogs was successful in two other human beings. Further tests with the blood of this animal were not possible.

The skin sensitizing antibodies in the serum of a dog naturally sensitive to *Ascaris* were heat labile and resembled in this respect human atopic reagins. *Ascaris* antigen produces skin sensitizing antibodies in human beings and the authors actively sensitized two dogs four months old with *Ascaris* extracts. Passive transfer tests with the serum of one of these dogs were negative but they were weakly positive with the serum of the other.

G. Lapage

ROY NAV MED BULL 1944 No 11 9-11 Filariasis

Some apprehension has been caused among American naval personnel stationed in the Samoan Islands by the occurrence of a number of cases of filariasis among them. The clinical diagnosis was confirmed by the discovery of adult filariae in excised tissue although in no case have microfilariae been found in the blood. A survey showed that troops were being infected in the islands Tutuila Upolu Wallis Funafuti Borabora and occasionally in the Tonga Islands. *Aedes scutellaris* var *pseudoscutellaris* [*Aedes variegatus*] is the chief if not the only vector. Dissection showed that a high percentage of these mosquitoes in the villages were infected but very few of those caught 100 or more yards away from the villages. The disease exists in natives throughout both the Central and South Pacific areas but it has only been found in the troops in the Central Pacific area probably because closer association with natives has been necessary there. A different mosquito *Anopheles punctulatus* var *moluccensis* is the vector in the South Pacific area.

[this term appears to include the New Hebrides and the Solomon Islands] Patients should be assured that the risk of functional impairment of the reproductive organs and of the development of elephantiasis is very slight and that spontaneous recovery is to be expected after leaving the infected area [See also this *Bulletin* 1944 v 41 599 and 860] J F Corson

NEUMANN H. Filariasis in the White Man *J Trop Med & Hyg* 1944 June July v 47 No 3 25-8

In the Samoan Island a newcomer of white race may show no symptom of filariasis even when heavily infected. When symptoms are present in early filariasis they may be classified into three types — (1) allergic (?) due to streptococcal superinfection and (2) due to staphylococcal superinfection. In the allergic type a diffuse oedematous swelling develops usually in a limb but sometimes in the scrotum there is no reddening of the skin no pain and little or no malaise or rise of temperature. It lasts for about a week and then subsides. It is thought to be due to reaction to dead filarial worms in the tissues. It is not seen earlier than five months after arrival in the endemic area. The attacks may be repeated but the prognosis remains good and no treatment is required. When streptococcal infection via the blood stream is superadded lymphadenitis followed by lymphangitis develops the skin shows red streak and fever (slight or high) malaise tenderness and swelling of lymph glands are also present. The attack lasts for about a week or more. It usually affects the limbs or scrotum sometimes the breasts ears or labia. These attacks are called *mumu* in the Samoan language, the word meaning red. If they are frequently repeated during several years elephantiasis may develop and this should be avoided by departure from the endemic area. This type can be cured with sulphonamides. The third type due to superinfection with staphylococci is less common in white people than in the natives. Fever local swelling and pain may occur and an abscess may form. The limb and scrotum are the parts most commonly affected. The condition is not responsive to sulphonamides but if spontaneous absorption is slow an incision will quickly cure it. Repeated attacks do not lead to elephantiasis.

Elephantiasis and other form of chronic lymph stasis occur after long residence after departure from the endemic area no further increase in the condition need be expected.

Microfilariae are usually not found in the blood before the 7th year after infection as they are too few to be seen in the 20 mm of blood usually examined. They are sometimes found in hydrocele fluid in the second year after infection. The combined span of life of an adult worm and its microfilariae is probably about 15 years.

The diagnosis of early filariasis must rest on clinical symptoms skin tests have hitherto been found to be unreliable. Practically the only way to prevent infection is by protective measures against mosquitoes. The vector *Aedes taeniorhynchus* [*Aedes scutellaris pseudo-scutellaris* of some authors] has not a long range of flight. Since microfilariae are absent from the peripheral blood there is practically no danger that a returned patient will introduce the disease into temperate climates. Usually after leaving the area no further attacks occur. Except when the genital region is attacked the first

and third types of symptoms do not require the patient to leave the area [See also this *Bulletin* 1944 v 41 599 600 and 860]

J F Corson

HARTZ P H Contribution to the Histopathology of Filariasis *Amer J Clin Path* 1944 Jan v 14 No 1 34-43 9 figs

In lesions caused by *Wuchereria bancrofti* the author found epithelioid cell granulomatous lymphangitis in 5 out of 10 cases. In several cases which showed this histological picture the examination of more sections led to the finding of the filaria. Details of three cases are given. The granulomata can be found in the lumen and wall of the lymphatic vessels in the lymph nodes and in the connective tissue. They are most typical in the lymphatics. Different aspects of epithelioid cell granulomatous lymphangitis are found according to the age of the lesions. The simplest form is a more or less loose collection of epithelioid cells histiocytes and lymphocytes usually not connected with the wall of the lymphatic vessel whose endothelium is intact and there is no regular arrangement of the cell types. Cells transitional between histiocytes and epithelioid cells are easily found. The form of the epithelioid cells is not different from that found in tuberculous lesions their nuclei are oval or more elongated and often band like or slightly curved. In a more advanced stage of the lesions the epithelioid cells are closer together with only a few lymphocytes and bands of fibrin threads between them. Lymphocytes may occur around the accumulations of epithelioid cells. There is no necrosis when the microfilariae are intact. Smaller lymphatics become occluded by this granulomatous mass connective tissue fibres appear between the cells and thus the author thinks leads to fibrosis. The endothelium of the vessel is intact until it is obliterated. In the larger lymphatics the accumulations of cells are often near to or in contact with the valves which may be thickened by cellular infiltration. This process is combined with narrowing and obliteration of the lymphatics by granulomatous perilymphangitis the product of which resembles small epithelioid cell tubercles with or without giant cells. It leads to narrowing of the lymph vessels whose endothelium is pushed inwards towards the lumen. It is the author thinks typical of filariasis that isolated granulomatous masses connected with the wall of the lymphatic but covered with endothelium may occur in the lumen. In the sinuses of the lymph nodes there are small groups of epithelioid cells sometimes combined with Langhans giant cells or with more atypical giant cells. There may be pronounced dilatation of the sinuses. Small pseudo tubercles are found in the connective tissue where there may be infiltrations of plasma cells and lymphocytes. If the microfilariae are still alive eosinophils are few or absent. If the microfilariae have been dead for some time very large numbers of eosinophils may be present. No neutrophils were found even when acute inflammation had been diagnosed clinically. Dead adult worms are often surrounded by necrotic tissue walled off by epithelioid cells and giant cells and this can be easily mistaken for tuberculosis especially when pseudo tubercles are found near by and when the filaria has disintegrated. In such cases the examination of many sections may lead to the finding of remains of the nematodes. The changes described are typical but not specific for filariasis they strongly indicate a careful search for the nematodes [For other descriptions of the histopathology of filariasis see reference in this *Bulletin* 1936 v 33 592 and MICHAEL below] G Lapage

MICHAEL P. Filariasis among Navy and Marine Personnel Report on Laboratory Investigations *U S Nat Med Bull* 1944 May 1 42 No 5 1059 74 5 figs

The author reports his experience with cases of infestation with *Wuchereria bancrofti* acquired in the Samoan region. He took several thousand blood smears by day and night from patients with clinical symptoms and used concentration methods but found no microfilariae. No other features of diagnostic value were seen in the blood picture. Most of the patients developed symptoms 7-9 months after exposure to infestation. They had chills, mild fever, malaise, nausea and occasional photophobia. They often noted painful swollen red areas on the extremities which later involved adjacent lymph node and retrograde or centrifugal lymphangitis might follow. The vast majority had funiculitis with or without epididymitis, orchitis or hydrocele; the highest incidence involved the scrotum followed by the arms and legs. Most patients had one or more relapses and after each attack the remissions lasted longer and the relapse were of shorter duration [cf FLYNN below].

The author did skin tests with antigen of *Dirofilaria immitis* using the technique of DICKSON, HUNTINGTON and EICHHOLD [this *Bulletin* 1944 1 41 303]. 268 out of 307 patients (87.3 per cent) showed positive immediate and delayed reactions and all the patients were free from infestation with other nematodes.

The histopathology of the lesions is described in detail. Biopsies were made. 36 of 120 specimens showed living or dead worms in the peripheral lymphatics and 11 in the lymph nodes [cf FLYNN below]. The author found that surgical investigation of lesions of the spermatic cord was unwise because complicating relapses followed but the removal of lymph nodes or lymphatics from the arm was harmless and in some cases apparently beneficial since it removed adult worms full of embryos. Four adult pregnant worms were thus removed.

The author emphasizes the value of serial sections and describes the inflammatory reactions observed in the tissue. Calcification of the worms seemed to begin centrally and involved the cuticle last. This is contrary to the finding of O'CONNOR and HULSE [this *Bulletin* 1936 1 33 592]. Living filariae were found to emerge from the cut surface of glands after the latter had been left for many hours in normal saline at 37°C. This saved the labour of minute dissection.

The author concludes that spontaneous recovery takes place after the departure of the patient from the endemic area. It is doubtful whether the infection causes any decrease in fecundity but if it occurs it is probably only temporary. As no microfilariae were found in the blood, filariasis is unlikely to become a public health problem in the United States.

G. Lapsley

FLYNN P. D. Filariasis Suspects. Review of Cases Admitted *U S Nat Med Bull* 1944 May 1 42 No 5 1075 9

The author examined 125 young healthy white male Marines of a battalion formed and trained in American and British Samoa and Wallis Islands who were suspected to have filariasis. After leaving the Samoan area in December 1942 they lived in the New Hebrides and Russell Islands until they began to be admitted to hospital in March 1943. Military duties had involved close association with the native population.

Eight of the patients showed microfilariae either in their blood or in fluid aspirated from lymph nodes aspiration was done in five patients only

The shortest interval between arrival in Samoa and the appearance of the first symptoms among the 8 patients in whom infection was confirmed microscopically was 8 months while the longest interval was 14 months for the entire group the shortest interval was 1 month the longest 15 months and the average 7.6 months

All the 59 lymph nodes excised (51 inguinal and 8 epitrochlear) showed evidence of chronic lymphadenitis and 24 were regarded as being probably examples of filariasis no adult worms were found None of the patients from whom glands were excised had microfilariae in the blood

G Lapage

STEWART M A. Filariasis *Proc & Papers 13th Ann Conference Californian Mosquito Control Ass* 1944 Feb 28 & 29 Berkeley Ca 6-8

KNIGHTS H T. Comments on Filariasis [Correspondence] *New Zealand Med J* 1944 June 143 No 235 153-4

During a stay of three years in Africa the author was often bitten by *Chrysops*. On the voyage back to New Zealand he had frequent attacks of urticaria when pun in the chest became associated with these attacks he underwent a clinical examination and a Casoni test for hydatid disease The test was positive ++ but serial X rays and the hydatid complement fixation test gave negative results At the time of writing the present note 4 years after leaving the *Chrysops* infested area he had just observed a filarial worm *Loa loa* wriggling under the skin of his forearm [The author does not mention blood examination or other confirmatory evidence]

J F Corson

MAZZOTTI L & OSORIO Maria T. Experimentacion sobre pruebas alergicas intracutaneas en el diagnostico de la oncocercosis [Experiments on Intracutaneous Allergic Tests in the Diagnosis of Onchocerciasis] *Rev Inst Salubridad y Enfermedades Trop Mexico* 1943 Dec 14 No 4 353-7 English summary (3 lines)

The authors made two antigens from *Onchocerca caecutiens* digested out of cysts recently removed Antigen I was made according to the technique of BOSICEVICH (1938) [no reference is given but see this *Bulletin* 1939 1 36 847] Antigen II by the same technique but with the addition of 1:20 000 merthiolate Antigen I diluted 1:10 000 gave negative results in 31 out of 36 healthy people in 4 it produced a papule less than 5 mm in diameter in one it produced a papule 10 mm in diameter with slight erythema Antigen II diluted 1:8 000 produced no reaction with a diameter greater than 5 mm in 10 healthy people Both antigens were tested in the onchocerciasis zone of Chiapas in the same dilutions on patients with nodules and on others from whom nodules had been removed several times but who had no nodules at the time of the tests although in all of them biopsy of the skin revealed microfilariae Antigen I was tried on 40 patients without nodules In 13 of these it caused erythema and in 7 papules with only slightly marked pseudopodia Tried on 31 patients with nodules this antigen produced papules with erythema around them in 18 and reactions with pseudopodia in 10 Antigen II was tried on 32

patients without nodules of these 14 showed erythema and 5 pseudopodia. Tried on 13 patients with nodules it produced erythema in 4 and pseudopodia in -

All these were immediate reactions appearing before 15 minutes and disappearing in 20-30 minutes. Taking reactions with a diameter of 5 mm or more with or without pseudopodia as positives the results showed that with antigen I 28 out of 40 patients without nodules and 19 out of 31 patients with nodules were positive with antigen II all were positive. Since the 10 healthy people tested with Antigen II were not enough 71 patients in a Mexican surgical hospital were tested. 10 of these were considered positive and 13 per cent gave false positive results. The different results with the antigens were perhaps due to its higher dilution. The high percentage of false positive in patients without onchocerciasis suggests that the antigens are useless for diagnosis. The authors think that serological diagnosis is not necessary because the disease can be diagnosed by clinical signs and by the finding of microfilariae by biopsy. They are continuing their work because of its general interest.

C. Iaparte

VON HOFF, F. H. An Improved Method of demonstrating Ova of *Enterobius vermicularis*. *J. Amer. Med. Ass.* 1944 May 6, 125 No. 1: 27-8. 2 figs.

A strip of adhesive scotch tape three eighths inch wide is held over the lower end of a half inch test tube with the adhesive side outwards and applied firmly to the anus with side to side friction to get a satisfactory smear. It is then applied to a microscope slide. Examination under the microscope often shows three to six ova, sometimes many more in a single field.

J. I. Corson

MAZZOTTI, I. & PASTRANA, A. La investigación de triquinosis en tejido muscular por el método de digestión [The Investigation of Trichinosis in Muscular Tissues by the Digestion Method]. *Rev. Inst. Salub. y Enfermedades Trop. México* 1943 Dec, 4 No. 1: 337-42. English summary.

Experience shows say the authors that in most instances the number of calcified cysts of *Trichinella* found by the digestion method does not correspond with the number found by examination in a compressorium. The authors investigated the reasons for this. They counted the calcified cysts found in diaphragms by the compression method and then digested the same pieces of diaphragm in artificial gastric juice and counted the cysts in the sediment of the digest. The number of cysts found in the digests was always smaller than that found with the compressorium. When 63 cysts dissected from a diaphragm were put in a Petri dish with gastric juice and watched the authors observed that 40 had disintegrated in 24 hours and they counted 5 dead larvae. Of the 23 cysts left 6 were still identifiable after 96 hours. It is evident therefore that calcified cysts can disintegrate relatively easily in artificial gastric juice. This partially explains why no cysts may be found by digestion when they have been found with the compressorium and also the lack of proportion found by some workers between the number of calcified cysts obtained in a small specimen of muscle and the number obtained in a piece fifty or more times as big. When the digest is shaken the digestion of cysts may be more extensive. The age

and condition of the cysts also probably affects the degree to which they can be digested. This digestion of the cysts helps to explain the discrepancy between the numbers of cysts obtained by compression and those obtained by digestion. An explanation given by other authors is that dead larvae and cysts do not easily pass the screen of the Baermann apparatus used in the digestion method.

The authors think that for examination by compression pieces of diaphragm weighing more than 1 gm should be used. They themselves used pieces weighing 10 gm. They used the digestion method only on those samples which were negative to examination by compression. JACOBS (*J Wash Acad Sci* 1938 v 28 452) found that 100 diaphragms were negative to routine examination by compression and digestion when pieces weighing 1 gm were used but when pieces weighing 10 gm were examined by compression 6 per cent were positive.

G Lapage

DEFICIENCY DISEASES

BEAN W B SPIES T D & BLANKENHORN Marion A. Secondary Pellagra. *Medicine* 1944 Feb v 23 No 1 1-77 [402 refs]

Pellagra has usually been classified as endemic alcoholic and secondary. In the endemic class are normally included patients who subsist upon diets that contain insufficient niacin (nicotinic acid) for a normal person. Secondary pellagra occurs when some condition interferes with the orderly processes of nutrition in one of a variety of ways. This review classifies these various factors that may produce secondary pellagra discussing the previous literature and illustrating the conditions from the experience of the authors.

Dr Spies and his colleagues have studied 388 cases of secondary pellagra of whom 146 were seen in two hospitals in Ohio during the period 1930-1939 and the remainder in the Nutrition Clinic at the Hillman Hospital in Birmingham Alabama in 1940-1941. The factors responsible for the production of secondary pellagra in the two areas were in general similar although pulmonary disease was more important in Ohio and malaria in Alabama. Apart from pregnancy and lactation surgical operations were the most important of the factors that precipitated the disease. Other conditions include diseases of the alimentary canal disorders of the stomach being particularly important. There is a widespread belief that the stomach produces an intrinsic factor that interacts in some way with niacin. The frequency with which hepatic disease is followed by pellagra suggests that the liver may play some as yet unknown rôle in the metabolism of niacin.

It seems that pellagra appears when the body is unable to make an enzyme that contains niacin. This may arise from insufficient ingestion of niacin from failure to absorb it (for instance in severe vomiting or diarrhoea) or from failure to metabolize it in ways as yet unknown. Since the amount of niacin required by the body is proportional to the metabolism the daily requirement is increased by fevers neoplasms parasites and childbearing. All these factors are admirably discussed in the course of the review. The bibliography is full and contains many unfamiliar references but some of the best work (e.g. by SYDENSTRICKER D T SMITH and RUFFIN) is omitted.

H M Sinclair

BEAN W B SPIES T D & VILTER R W Asymmetric Cutaneous Lesions in Pellagra *Arch Dermat & Syph* 1944 May 1 49 No 5 335-45 4 fig [Ref in footnotes]

The normal physiology of the skin is not yet well understood the smaller quantity of blood needed for local metabolism and the larger portion concerned with the regulation of temperature are two problems needing separate study. The skin lesions in pellagra may show different phases of evolution in different parts of the body at one and the same time both in ambulatory patients and those confined to bed. Such facts suggest that some local factor plays a part. The authors quote STANLEY [this *Bulletin* 1937 1 34 183 — The facts in regard to the distribution of the exanthem in pellagra may be stated in reality quite simply though they appear to have escaped the observation of most pellagrolomists. The exanthem tends to appear in those areas of skin which in any particular individual have *under one certain chain* as the result of the action in the past of traumata of various kinds including solar radiation exposure to cold friction pressure irritants etc. the change being in the skin capillaries the agent being non specific.

In view of the suggestion that local factors determine the site of the pellagrous eruption Bean and his colleagues made a study of all the cases exhibiting an asymmetrical distribution of lesion. Among 489 cases of pellagra 32 (3.4 per cent) exhibited unilateral or asymmetrical dermatitis. Case notes of fifteen patients are given—in five the cutaneous lesions were associated with unilateral varicose veins in five with unilateral pressure or irritation in two with infected skin wounds in one with paralysis while in two no association was noted. In bed case lesions occurred about the elbow upon which the patient habitually supported himself etc. In practically all these cases the site of the unilateral lesion appears to have been determined by previous trauma. It would appear that conditions were present which possibly led to inadequate blood supply and so to anoxia. Using electrically heated pads and a pneumatic tourniquet the authors therefore attempted to produce pellagrous skin lesions but only in subjects who were about to experience a new outbreak of the pellagrous exanthem were we able to produce a lesion identical with the naturally occurring cutaneous changes. The conclusion is that increased local metabolism in the presence of ischemia may produce a change in the skin of a susceptible pellagrin not to be distinguished morphologically from the dermatitis which is part of the disease as it develops spontaneously in malnourished persons. *H S Stanley*

VERMA O P Note on the Treatment of Angular Conjunctivitis with Riboflavin *Inda Med G* 1944 June 1 79 No 6 258-9

Cases of angular conjunctivitis were successfully treated by the administration of riboflavin. Before treatment smears showed numerous Morax-Axenfeld bacilli which disappeared after treatment. In the majority of cases ocular and other signs of riboflavin deficiency were present.

HAEMATOLOGY

- CANBY C B CARPENTER G & ELLMORE L F **Drepanocytosis (Sicklelemla) and an apparently Acute Surgical Condition of the Abdomen Report of their Occurrence in a White Youth with Laparotomy** *Arch Surg* 1944 Feb v 48 No 2 123-5 [19 refs]

A case of sickle cell anaemia in a Sicilian youth aged 19 and born in America is described. The symptoms indicated an acute abdominal condition possibly torsion of the spleen or volvulus of the small intestine and laparotomy was done. The spleen was enlarged covered with fibrin and attached to surrounding structures by older fibrous adhesions. It was removed the patient recovered from the operation and was discharged from hospital about a fortnight after admission. The immediate post operative diagnosis was multiple infarcts of the spleen cause unknown. Some weeks later it was found that he had sicklaemia. The blood of his parents and of two brothers and four sisters was examined but showed no sickle cells.

The authors give a list of cases of sickle cell anaemia in persons with no evidence of recent negro ancestry. They include a Greek four Italians eight Sicilians and three Americans. This is stated to be the first recorded instance where laparotomy has been performed in a Caucasian on account of an acute abdominal syndrome in this disease.

J F Corson

VENOMS AND ANTIVENENES

- BOQUET P **Sur les proprietes immunologiques du serum de la vipere commune de France (*Vipera aspis*)** [Immunological Properties of the Serum of *Vipera aspis*] *C R Soc Biol* 1943 Nov v 137 No 21/22 700-701

It has long been known that the serum of *V. aspis* will protect against the venom of that snake and the author has previously shown that it will neutralize the venom as efficiently as the best hyperimmune horse serum. He now states that a mixture of venom and viper serum does not precipitate but addition of therapeutic antivenene causes precipitation though addition of normal horse serum or anti *welchii* serum does not. An antiserum prepared by injecting viper serum into rabbits precipitates both the viper serum and the viper venom but 4 cc of this antiserum does not neutralize 10 mgm of venom. It appears therefore that the viper serum contains an antitoxin capable of neutralizing the venom and also antigenic non toxic substances common to the serum and the venom.

Charles Wilcocks

- BATT B E A **Two Cases of Snake Bite** [Memoranda] *Brit Med J* 1944 Aug 5 181-2

Two boys aged 12 and 14 years were bitten by the same *Vipera berus* and both on the hand. The one first bitten suffered considerably from shock. In both a very early symptom was vomiting and both complained of sore throat. The younger was the first to be bitten and probably received more venom than the second. The first was bitten on

the dorsum of the hand and probably directly into a vein because on incision very little blood flowed and it clotted immediately. The child was admitted to hospital five hours after receiving the injury and was treated for shock. Antivenene was obtained and as the patient still complained of sore throat and his arm, shoulder and upper part of the chest were tender and oedematous 10 cc of it were injected intramuscularly. Recovery was uneventful.

The second boy was bitten on his little finger. Symptoms vomiting and sore throat set in 1½ hours later and the hand became swollen and painful. He was admitted to hospital 4½ hours after being bitten. The site was incised and bled freely and a dressing of potassium permanganate was applied.

The chief interest of this narrative lies in the treatment adopted and in the author's comment. There is no little doubt and difference of opinion regarding the treatment of snakebite. All however are agreed that suction is good. This was promptly done by a companion in the case of the second boy. No mention of it is made in the case of the first who was more severely bitten. Incision is usually to be avoided say many as it increases the likelihood of secondary infection. It was carried out by a master with his penknife in the first case at the hospital under anaesthesia in the second. FAIRLEY on the other hand favours incision. If permanganate is used it should be injected early but most recent authorities state that no reliance is to be placed on permanganate. Antivenene to be of any service must be given early and in large doses to give 10 cc only and that 4½ hours after the bite is mere waste of antivenene. The author comments as if it were unusual that in this instance the viper did not discharge all its venom at the first bite. A colubrine snake may do this but it is safe to say that a viperine never does. A colubrine clings on and bites a viper gives a quick bite and is off. Finally the author states. It proved impossible to procure antivenene through the usual channels. He does not say what channels he tried.

H. H. Old Scott

DERMATOLOGY AND FUNGUS DISEASES

MOURAO B. M. O papel do estreptococo no pempho foliaceo (fogo selvagem). Estudo clínico-bacteriológico. [The Role of Streptococci in *Pemphigus foliaceus* (Wild Fire). A Clinical and Bacteriological Investigation. *Mem Inst Butantan* 1943, v. 17, 141-228. 28 figs & 8 graphs. [83 refs.] English summary.]

This monograph is a detailed account of an investigation well planned and carried out with the utmost care. Those interested should study carefully the original for it is so replete with matter that abstract is far from easy and the whole article would repay translation. It is divided into twelve chapters of which the first is introductory and the last recapitulatory.

LINDBERGH in 1937 as the result of certain experimental work came to the conclusion that Fogo selvagem (*Pemphigus foliaceus*) DuRoi's dermatitis herpetiformis and ordinary pemphigus all had the same causal agent a virus. The present author while acknowledging that search for a virus as the cause of *Pemphigus foliaceus* should be continued is of opinion that a streptococcus plays a part and this study is

a serious attempt to clarify the subject and to determine what part this organism does play. In the second chapter he reviews the literature published by many who have isolated the streptococcus from skin affections. recent views tend to enunciate the following sequel of events—a focal infection with streptococci spread to the general circulation localization in the skin and the production of streptococcal bullae.

The broad scheme of the present study has comprised skin cultures haemocultures and the bacteriological investigation of tissues and fluids ante and post mortem. The clinical study is based on 160 cases. 36 in the initial stage. 87 of the generalized chronic form. 15 of generalized dermatosis (dystrophic form). 12 of localized dermatosis (formes frustes). 8 in the retrogressive stage and 2 cured cases. The generalized chronic form includes those with large bullae those in an advanced foliaceous state the pustulo-bullous hyperpigmented herpetiform and the papillomatous or verrucose.

Skin culture was made in 53 cases. 21 in the chronic generalized form. 16 in the early stage. 8 of the formes frustes and 8 regressing. Culture was made with the fluid of the bullae and with the crusts. Forty three had streptococci grown from the lesions. all of those with crusts or with purulent contents gave a growth but none of those with clear fluid. The crusts gave also growths of *Staphylococcus albus* or *aureus* a diphtheroid organism and in one instance a pneumococcus. Of the patients with generalized dermatitis five gave a growth of *Streptococcus haemolyticus* from turbid fluid in the bullae and two from the clear contents of bullae in the same patients. Of the eight formes frustes cases four gave a growth of *Staph albus* from the crusts. one a *Staph aureus*. two gave a streptococcus. one of the Beta type and one of the Gamma (inert) type.

Skin cultures were made from four cases of Duhring's disease (says the author but he gives a table showing five). *Strept haemolyticus* was grown from both the clear and the turbid contents of bullae in one patient the same together with *Staph albus* from the turbid contents of another and *Staph aureus* alone from the turbid fluid of a third.

Blood cultures were made on 150 patients. 36 in the early bullous stage. 82 of the chronic generalized form. 15 of the dystrophic form. 12 of the formes frustes and 5 in an apparently regressive stage. Nineteen gave growth of streptococcus (12.6 per cent). five a staphylococcus (3.3). 126 (84) were negative. Fourteen of the 19 positive streptococcus patients died. No streptococcus cases were among those in the early stage. 12 were of the generalized chronic form. five of the dystrophic and one each of the formes frustes and the apparently regressive. Blood cultures were tried in six cases of acute febrile pemphigus and of dermatitis herpetiformis of Duhring. *Streptococcus viridans* was grown from one. the others gave no growth at all.

Post mortem cultures were made from the heart blood and the tissues of 24 patients. Streptococci were grown from 23 of these in four a pure culture. the chief of the others were *Bact coli* and *Staphylococcus albus* or *aureus*. Streptococci alone or with others in the heart blood of 17. from the spleen in 18. the liver 11. brain 6. kidneys in 5 (none in pure culture). pericardial fluid three.

Later chapters are concerned with the strains of streptococcus isolated their microscopical and cultural characteristics chemical and biological reactions pathogenicity and serological classification. The organism isolated from cases of pemphigus foliaceus belonged to

the Rosenbach haemolytic Beta type and Lancefield's group A produced acid in dextrose laevulose galactose mannose saccharose maltose lactose trehalose dextrin starch and salicin was virulent on peritoneal injection into rabbits guinea pigs rats and carndon on (Brazilian house-rat)

There follows a discussion of the rôle of streptococci in skin affections with abundant quotations from the literature. The main conclusions of the author on the whole subject may be epitomized as follows —

- 1 Streptococcal infection plays a large part in pemphigus so acnes
 - 2 The organism is a Beta haemolytic streptococcus of Lancefield's group A
 - 3 It can be isolated from the heart blood and omentum just after death
 - 4 The plasma of patients soon after death of the body contains an antistreptolysin
 - 5 The seriousness of the cutaneous infection is directly connected with the presence and virulence of this organism
 - 6 It is present in the skin and other organs in the late stages of the disease
- It is not possible to affirm that the streptococcus is the primary cause of pemphigus foliaceus
- See also the Bulletin 1943, 40, 48-488

H. H. and Sco

KEMPER J W & BLOOM H J. Histoplasmosis. Report of Case. J. Otol. 1944, 2, 16. Summary taken from J. Amer. Med. Ass. 1944, July 15, 123, 11812

A man aged 39 entered the hospital complaining of sores on the tongue and upper lip which had had their onset four months before. The lesions persisted throughout the period of hospitalization. Pharyngeal and laryngeal lesions of a similar character developed with hoarseness and loss of weight. There was remittent fever with excessive fatigue and weakness. In sections stained by the Gram method numerous small basophilic inclusions were noted chiefly in the reticuloendothelial cells. They could not be definitely identified as Histoplasma capsulatum. The close resemblance of the disease process to histoplasmosis was considered despite failure to substantiate it. The patient received iodine, bismuth, antimony and sulfadiazine in full therapeutic doses for trial periods. Germicidal and parasiticidal solutions were applied to the lips face and heavily fortified with iron and vitamin concentrates. Radiation therapy was instituted 900 roentgens being applied to the first admission and ten months after the onset of symptoms. Microscopic postmortem studies revealed Histoplasma capsulatum in the adventitia of the smaller blood vessels in the cortex of the brain and in a few mononuclear phagocytes. An ulcer at the base of the capsule was demonstrated in some mononuclear phagocytes in the granulation tissue of the buccal ulcer. Many of the organisms were seen in the lymphocytes and giant cells. Many of the organisms were seen in the lymphocytes plasma cells and large mononuclear phagocytes in the granulomatous tissue of the laryngeal mucosa. Large mononuclear phagocytes in the red pulp of the spleen contained Histoplasma

capsulatum The liver showed four bodies resembling *Histoplasma*
 capsulatum Giemsa stained sections of the ureters showed two *Histo*
 plasma organisms

ALBERT W B & ZIGLER R F Jr A Simple Effective Treatment for
 Epidermophytosis *Southern Med J* 1944 June 37 No 6
 348-9

The authors have been using the following preparation for some years
 Salicylic acid U S P 10 gm Acetone U S P 33 cc Glycerol U S P
 33 cc 80 per cent ethyl alcohol 33 cc The solution has been used on
 50 unselected cases of ringworm including examples of *tinea pedis*
tinea cruris and *tinea circinata* The treatment was applied by freely
 mopping the infected areas and mopping rather vigorously where foot
 infections were concerned for two or three minutes and then waiting
 for perhaps five minutes before replacing socks or clothing Instruction
 in pertinent foot or body hygiene was given so as to lessen the chances
 for reinfection The patients were seen again in from five to seven days
 and when necessary the treatment was repeated The results were
 uniformly successful Relief from itching was prompt usually a matter
 of minutes following the application More than half the patients were
 completely healed after one application and all were healed after two or
 three applications at five to seven day intervals There were no cases
 requiring a fourth treatment One further quotation is necessary
 it has been used by one of us in treating his own frequent infections
 of athlete's foot

[There is little doubt that this lotion is of definite value WHITFIELD
 for some years used a similar preparation consisting of 5 per cent
 benzoic acid 3 per cent salicylic acid 25 per cent acetone in either
 rectified spirit or spt vin meth (industrial) thus did not yield the
 quick results claimed by Albert and Zeigler The authors do not refer
 to any microscopical examinations do not mention periods of quiescence
 during sporulation cold weather etc and by admitting that one of
 them had had to use the lotion to combat his own frequent attacks of
tinea pedis imply that the method is not perfect]

Sydney Thomson

GOTTLIEB A Madura Foot or Mycetoma Report of Two Cases *Western J*
of Surgery Obstet & Gynecol 1944 June 52 No 6 264-5 2 figs
 LEITE S Mycetomas [Mycetoma] *Clinica Hygiene e Hidrologia* Lisbon
 1943 Oct 9 No 10 269-76
 A general account

MISCELLANEOUS

WROTH E P & MOHR J L Manual on the Distribution of Com-
 municable Diseases and their Vectors in the Tropics Pacific
 Islands Section—Part I *Suppl to Amer J Trop Med* 1944
 May 24 No 3 26 pp
 The manual of which the present section is to form one part is a
 time outgrowth of the senior author's work in the Pacific Islands

and an editorial comment promises the complete series. When the whole is completed it will form a very useful basis for a world survey of tropical diseases.

Charles H Wilcocks

FAUST E C Disease in the Tropical War Zones III The Diseases of the Mediterranean Basin and of Tropical Africa *Gastroenterology* 1944 Jan v 2 No 1 13-31 figs 12-22 [18 refs]

In this paper the author discusses two of his nosographical areas together namely the Mediterranean Basin and Tropical Africa [This may be the explanation of the fact that there is no Part II of this series]. The diseases concerned are malaria typhoid the dysenteries helminthiasis leishmaniasis fevers of the typhus group dengue leprosy and venereal diseases. The distribution is illustrated in a series of 11 maps. For each disease or group of diseases a few sentences of explanation or comment are added. These contain no new facts and the subject matter is familiar to those who have studied tropical diseases. The main value of the paper is in the maps which give a clearly discerned picture of disease distribution.

Charles H Wilcocks

SAWYER W A The Introduction of Tropical Diseases other than Malaria into the United States after the War *J Nat Malaria Soc* Tallahassee Fla 1944 June v 3 No 2 115-20

In this address the author apart from remarking briefly on the diseases concerned reviewed the part that could be played in relation to them by the American Society of Tropical Medicine at a meeting of which the address was delivered. The Society may help by giving advice through its members many of whom would be engaged in control or cure of the introduced diseases. It could formulate programmes of investigation or control. It could exert influence by prompt publication of papers on the subjects concerned. It could put its influence behind the movement to improve the teaching of tropical medicine.

The various diseases and the possibilities of their becoming established in the United States are then briefly discussed.

Charles Wilcocks

YOUNG Ruth Medicine and Nursing in Ethiopia *Lancet* 1944 June 17 797-8

The common diseases of Ethiopia include typhus relapsing fever pneumonia venereal diseases ulcers scabies intestinal helminthiasis trachoma malaria and leprosy. Tuberculosis is probably not as prevalent as elsewhere in Africa [but the findings of D ARCANGELO (*Bulletin of Hygiene* 1944 v 19 597) indicate a fairly heavy incidence] and deficiency diseases do not seem to be common. In the absence of any vital statistics no morbidity or mortality rates are possible.

The author attempted to gain information on maternal and infant death rates by questioning 122 women. There was a remarkably low incidence of complications during childbirth [but in the absence of any indication of the number of maternal deaths to correspond with this number of surviving mothers too much reliance should perhaps not be placed on this finding]. The author thinks that the absence of professional midwives of the type common in India and who do so much harm there is probably responsible for the absence of sepsis. These 122 women reported 353 live births and of these infants 176 had died and

177 were alive. 109 had probably died during the first year of life. The chief causes of this high rate were probably syphilis, gastrointestinal troubles and pneumonia. Syphilis is very common and is also probably the main cause of the high sterility rate.

This state of affairs can be ameliorated only by intensive preventive work and teaching of mothercraft and hygiene. Small dairies can be left to nature leaving available trained persons to deal with other work. But at present properly trained nurses do not exist there though there are women dressers for the sick girl of higher standard of education are needed. The number of public health nurses should in the author's opinion be much greater than the number even in hospital and public health matters should be taught not in a school attached to a hospital but in a high school which is an educational institution in itself. Students should be resident and the proportion of teachers high. The author refers to the memorandum on nursing education in Africa by Dr Janet WELCH (this Bulletin 1931 & 38-39). This paper offers a good field for experiment with lines already stated in that memorandum.

Chas. H. S. Clark

ANDERSON, L. The White Race and the Tropics: a Post War Problem
Isis 1944, 34, 1-5. (Med. 1944, No. 2, 141-5.)

MILGOWSKI, J. Ueber sogenannte neue ansteckende Krankheiten
(The So-Called New Infectious Diseases). *Deutsch. med. Woch.* 1944,
Jan. 21 & 28, Nos. 34 & 37, 14 refs.

In this paper the author expresses a timely criticism of the tendency to regard unfamiliar infectious diseases as being new. He claims to have had considerable experience of the diseases of the region between the Baltic Sea and the Black Sea.

The new diseases discussed are Bessarabian fever (BERNHARDT 1942) & this *Isis* 1944, 34, 571; Ukrainian fever (WESTPHAL 1943); Leptos disease (RUTHE 1916) and Russian Leishmaniasis fever (SCHULTEN and BELLIE 1943).

The three fevers in this list have already been discussed in this Bulletin. The author has expressed regret concerning the validity of the author's claim that each of these fevers is a new one. *Isis* 1943, 34, 67 & 90-93, 1944, 34, 177.

The general conclusion of the author is the attention by all who are tempted to introduce new names to the existing nomenclature. The chief reasons for falling into the author's trap are—Negative bacteriological and serological findings and the failure to find a causative agent. It is justly a claim that the disease is a new one. German soldiers in Russia do not react to the special local infections in the same way as the indigenous inhabitants who are likely to have some degree of acquired immunity resulting from previous attacks. Infections caused by the same agent may be extremely variable in their manifestations. Protective inoculation causes a great modification of the clinical picture so that anomalous attacks of typhoid and paratyphoid fever are of frequent occurrence. The use of place names is condemned as leading to confusion through duplication. A study of the literature and consultation with physicians who have local experience is strongly recommended.

[The observers of the fevers referred to paid little attention to the epidemiological conditions of occurrence of the diseases.]

The author suggests that Bessarabia fever may be one of the protean forms of trench fever or one of the fevers of the typhoid group modified by inoculation that Ukranian fever may be a form of typhoid or paratyphoid that Reiter's disease is probably one of the many types of bacillary dysentery and that the Russian headache fever may belong to the serous meningitis group perhaps similar to Swincherds disease [see *Bulletin of Hygiene* 1943 v 18 703] or to the disease known in Russia as encephalo meningitis

John W D Megaw

LOWE T E Eosinophilia in Tropical Disease Experiences at an
Australian General Hospital *Med J Australia* 1944 May 20
v 1 No 21 453-6 1 fig

The author has studied the degree of eosinophilia in men of the Forces returning to Australia after a few months of tropical service. The total examined is too small to afford valid deduction but the findings will be of interest in stimulating to further work on the subject. As control the average of 100 healthy women showed 145 eosinophiles per cmm the limit ranging up to 700 [or almost 9 per cent of a total leucocyte count of 8000 which few people would regard as within the normal]. One hundred malarial convalescents gave figures ranging between 0 and 1350 with an average of 250 [This figure it will be seen overlaps the normal to more than half and as no totals are given the percentage cannot be calculated. Eosinophilia is not noticed in text book descriptions of the blood changes in malaria and it may be that these were residues of old helminthic infestation unrecognized but the author stresses the fact that the eosinophiles in the peripheral blood fall some 24-36 hours before the onset of malaria symptoms and increase again after the attack and he regards this eosinophilia as non specific and similar to what may occur after any acute bacterial infection].

In patients convalescing from malaria and also infested with *Trichuris trichiura* [there were only 11 of these] the number of eosinophiles ranged between 240 and 1700 per cmm with an average of 710 and of 200 similar convalescents infested with hookworms from 0 to 12500 with an average of 1800 [It is well known that in severe cases of ankylostomiasis eosinophiles may disappear altogether]. The highest numbers of eosinophiles were found in patients with *Strongyloides* infestation there were eight of these and the average was 2570 per cmm with limits of 1100 and 5300.

A third group the author classifies as unexplained eosinophilia fourteen came within this category and the minimum average figure was 1300 in a total of 9300 leucocytes (14 per cent) and the maximum average 2800 in a total of 12700 (21.8 per cent). Tropical eosinophilia the author rules out because of the absence of obvious lung involvement and the afebrile course of the illness. He then details as an instance a case in which moist adventitia were consistently at the back of both lungs and by X rays a general increase in the bronchovascular markings of the lower and middle zones but this largely disappeared after some weeks. This patient at one time had a total leucocyte count of 32500 with eosinophiles 22425 (69 per cent). Anthelmintic treatment was tried without avail. [In other words an almost typical case of Loeffler's syndrome or sitor infiltration of the lungs with eosinophilia. Specific treatment of eosinophilic lung by means of arsenicals is not mentioned as having

be made at any place from near the top to about 3 inches above the knee [Medical Officers in the tropics know that intramuscular injections are sometimes given too far back in the buttock and too near the gluteal vessels and nerves and the sciatic nerve instead of into the anterior superior quadrant selection of the thigh would avoid these mistakes and give a larger area for repeated injections but warning should probably be given that only the outer side of the thigh may be used] J F Corson

RAJINDAR PAL On the Histological Structure of the Midgut of Mosquitoes *J Malaria Inst of India* 1943 Dec v 5 No 2 247-50 7 figs on 1 pl

No histological differences can be detected between the midguts of four species of mosquito examined *Anopheles culicifacies* 4 *stephensi* *A subpictus* and *Culex fatigans* In all of them the presence of a delicate peritrophic membrane surrounding the gut contents is confirmed I B H: lesuorth

HERMS W B The Mosquito Vectors in the Pacific Area *Proc & Papers 13th An Conference California Mosquito Control Association* 1944 Feb 8 & 9 Berkeley Cal 1-0

WYNNS H L The Danger to Civilian Populations on the Pacific Coast from Mosquito-transmitted Infections in Returning Military Personnel *Proc & Papers 13th An Conference California Mosquito Control Association* 1944 Feb 8 & 9 Berkeley Cal -8

YOUNG J W Dermal Myiasis Report of Three Cases *Arch Dermat & Syph* 1944 May v 49 No 5 309-11

The paper consists mainly of a useful general account of myiasis in man. A case of larva migrans in which a number of larvae of the bot fly (species not named) were present is recorded and two cases due to larvae of *Wohlfahrtia* in all in the United States I B H: lesuorth

GOODRUE L D Insecticidal Aerosols *J Econom Entom* 1944 June 37 v 3 335-41

ROBINSON G G Testin Insecticides on the Argasid Tick *Ornithodoros moubata* Murray *Bull Entom Res* 1944 July v 35 Pt 2 95-9

This paper summarizes in tabular form the results of careful laboratory tests on a very long series of organic compounds as insecticides for the tick *Ornithodoros moubata*. None of these is as effective as pyrethrum. Indeed the tick is extremely resistant to most contact insecticides both sprays and dusts. Certain derivatives of phenol and naphthalene are active as fumigants and might possibly be of use as soil fumigants in the floors of huts I B H: glesuorth

ROY D N & GHOSH S M The Mechanism of Action of a Contact Insecticide *Bull Entom Res* 1944 July v 35 Pt 2 161-70 3 figs [11 refs]

From studies on the mosquito *Anopheles obtusatus* on blowflies and on lice the authors conclude that pyrethrum passes through the

cuticle so slowly that the insecticide entering by this route is of no importance in killing the insect. After normal spraying only droplets are readily seen in and around the tracheae. They conclude that the spiracles afford the chief means of entry for both sprays and dusts; if the spiracles are blocked the action of pyrethrum sprays and dusts is very slow.

[B Wigglesworth

FUTCHER P H CONSOLAZIO W V & PAGE N Water Balance of Survivors of Shipwreck in Tropical Waters War Medicine Chicago 1944 Apr v 5 No 4 203-6

This is a record of a rough field trial rather than a critical laboratory study and nothing new is added. Nineteen volunteers were observed over a period of 96 hours. For 61½ hours they were on inflatable rubber rafts moored in the Gulf of Mexico; for the remainder of the time they were on the deck of an escort vessel travelling between shore and rafts. Nights as well as days were spent on the rafts. All men wore cotton underclothes and cotton flying suits; sometimes the suits were worn open and on one occasion some men stripped to the waist. Light cotton headgear was worn by most of the subjects. The men rested on the raft and were allowed not more than 500 cc of water per day—in some cases fresh water in others demineralized sea water. Only 4 men took their full water ration. Tablet emergency rations were issued, each man taking on an average 53 gm of carbohydrate, 1 gm of protein and 5 gm of fat per day; the ration contained only traces of salt. Swimming or wetting the clothes with sea water was not allowed, but the trousers were usually wet with water shipped on board and the shirts were often moist with spray. Some men felt chilly at night but no other subjective impressions are mentioned. It is not stated whether the men sweated or not. During the test air temperatures varied from 80 to 86 F with the relative humidity usually 70-80 per cent. The sea temperature was 82-84 F. There was a wind varying from 3 to 18 m.p.h. During the day the sun was shining in the second half of the trial 6 men were protected from the sun by an awning.

From measurements of the body weights at 0, 48 and 96 hours, urine output and fluid intake, the evaporative loss was calculated roughly for each man; weight of food ingested and of stools passed were not included in the balance. On the first day many men vomited; this also was not considered in the balance. As the weights were only measured to ± 50 gm, the inaccuracies thus introduced are probably negligible. In the first 48 hours the average weight loss per man was 1.66 kilos per day; the average fluid intake 295 cc and the average urine loss 670 cc, with an average evaporative loss of 1.25 litres per day. In the second 48 hours the figures were: weight loss 0.845 kilo; fluid intake 330 cc; urine loss 440 cc and evaporative loss 0.73 litres. The authors suggest that the high evaporative loss in the first half of the trial was due to the previous rigour of the men. [The discrepancy appears to be greater than could be explained on those grounds; other factors concerned were probably:—(1) Inaccuracy of weighing (2) Greater activity on first day (3) Vomiting, this may well have been greater than the observers realized (4) Defaecation]. The men under the awning had a lower evaporative loss by 130 cc than the rest.

In their comment the authors compare the results of their field trial with similar studies by other workers. They emphasize the effectiveness of wet clothes in cutting down the evaporative loss and recommend

that men shipwrecked in warm seas should keep their clothes moist with sea water. It is unfortunate that they cannot produce stronger evidence for this recommendation than the following —

Present Test—clothes partially and accidentally wet—

Average evaporation loss 730 cc.

GABLE & BUTLER'S experiment—clothes deliberately wet—

Average evaporation loss about the same

Test on dry land—men working in laboratory —

Average evaporation loss 880 cc.

This effect has however been demonstrated also in well controlled experiments by other workers.

The authors conclude that as long as exertion is minimal seasickness: not excessive clothing is kept moist with sea water and a light breeze blows a supply of 500-1 000 cc of water a day will prevent the occurrence of dehydration in semi fasting survivors on lifeboats and raft in the tropics.

[From their own figures 500 cc of water per day will not prevent dehydration it will only slow the process up while 1 000 cc is needlessly generous. With a limited stock of water it is important to lay down narrower limits than these for a daily water ration and the M.R.C. Guide to the Preservation of Life at Sea after Shipwreck [*Bulletin of War Medicine* 1943 v. 3 463] recommends initially 18 oz (just over 500 cc) per day after one waterless day.]

W. S. S. Ladell

JOHNSON R. E. PITTS G. C. & CONSOLAZIO F. C. Factors influencing Chloride Concentration in Human Sweat. *Amer. J. Physiol.* 1944 June 1 141 No. 4 575-89 16 (36 ref.)

The authors start with a full summary of the literature since 1911 and summarize the results in a table. They find that all workers agree that the chloride concentration in sweat (1) tends to increase as work is prolonged (2) varies markedly between individuals (3) varies in different regions of the body (4) varies immensely as the supply of drinking water. There is disagreement on the effects of acclimatization, sweat rate, body temperature, salt intake and changes in plasma chloride. Observation on skin temperatures have been scanty.

Two different sets of experiments are recorded by the authors. (1) *Outdoor experiments*—Sweat was collected for chloride estimations at intervals in long rubber gloves from the hands and forearms of young men marching. The usual precautions were taken to avoid contamination and evaporation. At the time of collection the temperature and humidity of the environment were observed and the pulse rate, rectal temperature and the nude weight (to estimate the sweating rate) of the subject, measured. (2) *Hot room experiments*—Six men were made to march on a treadmill at 3½ m.p.h. up various grades at different temperature and humidities. Sweat was collected from one arm as in the outdoor tests and skin temperatures were measured by means of a thermo-junction on the opposite arm which was also enclosed in a rubber glove. In addition the same observations were made as in the outdoor subjects and blood samples were taken for chloride and protein estimations.

Outdoor experiments—25 experiments were made and 97 sweat samples collected. Two experiments are considered in detail in the first of these. One Group (A) received 9 gm of salt before marching.

the other Group (B) no salt in the second B received salt and A none. Both groups excreted sweat containing less chloride in the second experiment 30m eq/l as against 33 for A and 40m-eq/l as against 46 for B. The rectal temperatures were lower in the second experiment for both groups and the sweating rate less. Dry and wet bulb temperatures were 9 F less during the second experiment. In the other series of experiments the authors found that the concentration of chloride in the sweat rose consistently both with an increase in rate of sweating and with an increase in rectal temperatures. The relation between sweat chloride and rectal temperature is plotted graphically for two subjects.

Hot room experiments—In all the hot room experiments sweat chloride concentrations were consistently higher than those obtained in the outdoor tests, sometimes the concentration was double. The authors suggest that this is because in the open the chloride in the sweat is already excreted at a minimal concentration. [This is scarcely an explanation of the disturbing and often noted phenomenon if the concentration in the outdoor sweat was not minimal already any further fall would increase the discrepancy. In any case the reason for the discrepancy remains undiscovered.]

When subjects in the hot room drank water equal to two thirds of their sweat loss the average results from two subjects showed that — (1) Sweat chloride increased as the work was prolonged but the sweat rate diminished. (2) Changes in sweat chloride could be correlated with changes in urine chloride. (3) When water was drunk the rectal and skin temperatures remained lower than when no water was drunk and the fall in sweat rate with prolongation of work was not so marked.

The effect of drinking 0.2 per cent saline to equal the water loss was compared on three subjects with the effect of drinking the same amount of fresh water. The results show that other things being equal the sweat chloride is lower after drinking saline and that though the initial sweat rate is lower it does not fall off so rapidly during prolonged work. A table gives the results averaged for the three subjects and shows that at the same period in the experiments sweating and skin temperatures were the same after either fresh or salt water. The sweat chloride concentrations were 76m eq/l after salt and 96m eq/l after water with rectal temperatures 101.1 and 100.8 F respectively.

Figures are given which show that the sweat chloride is independent of either plasma protein or plasma chloride concentration. And the authors point out that their figures do not support the view that acclimatization as such is accompanied by a lowering of the chloride concentration in the sweat if the samples compared are taken when the rectal temperatures and rates of sweating are as far as possible the same. The apparent decrease in sweat chloride during acclimatization is due to the fact that a man develops a lower rectal temperature and has a lower sweating rate for a given rate of work when acclimatized than when unacclimatized.

The authors' conclusions are that the concentration of chloride in sweat (a) increases as work is prolonged (b) varies markedly between individuals (c) varies inversely as the supply of drinking water (d) decreases during the course of acclimatization but only as the rectal and skin temperatures decrease (e) increases as the rate of sweating increases (f) varies directly with the body and skin temperatures (g) varies inversely with the intake of salt. In a further analysis they

conclude that ultimately in the individual only 3 factors are concerned rectal temperatures skin temperatures and rate of sweating in support of this various series of observations on two subjects are listed —(1) In this rectal temperature and sweat rate were the same but skin temperatures were different (2) The variable was rectal temperature only (3) The variable was sweat rate only. The list shows a striking correlation between sweat chloride and skin temperatures [Skin temperatures several degrees above the rectal temperatures and as high as 106.2 F are somewhat surprising the air temperatures at which such readings were obtained are not recorded]. An equally good correlation was obtained between sweat chloride and sweat rate but the correlation of sweat chloride with rectal temperatures was poor. 11 observations on two subjects are reported and in four cases a higher rectal temperature was associated with a lower sweat chloride. The author states that a better correlation is obtained between rectal temperature and sweat chloride if variations in skin temperature and sweat rate are ignored.

Finally the authors draw attention to the importance of individual idiosyncrasy in governing the level of the sweat chloride. They consider that individual differences in the concentration of chloride in the sweat might be correlated with fitness for work in hot environments but they do not pursue their suggestions.

[It is disappointing that when so many observations were made more actual results are not given. The use of means derived from different experiments and different subjects makes it difficult to evaluate some of the results. Only forearm and hand sweat is considered in spite of the established fact that the constitution of the sweat varies in different parts of the body; no attempt is made to show whether or not the samples are representative of mixed sweat from the whole body. The correlation of sweat chloride with rectal temperature is not well substantiated by the results shown; no experiments are described in which sweat samples were obtained from subjects as they cooled down. If sweat chloride concentration varies with rectal temperature the sweat chloride should fall under these circumstances; in a few experiments of this type carried out by the reviewer the chloride concentration in the sweat did not fall but continued to rise. One factor recognized by the authors but given insufficient weight is the length of time sweating has continued; the longer the subject sweats the greater the chloride concentration in the sweat; this is well shown by the figures quoted for the salt and water comparisons—in both cases after four hours the sweat chloride concentration was raised but the rectal and skin temperatures were unchanged and the sweat rates diminished.]

W. S. S. Ladell

PALMER H. A. Case Report of Psychosis following Heat Stroke. *J. Roy. Army Med. Corp.* 1944 Apr. 8. No. 4. 166-9.

CAIBOLINAC F. J. C. *Sobre a habitação do Europeu nas regiões tropicais* [Domestic Hygiene for Europeans in the Tropics]. *Ciência e Saúde*. Rio de Janeiro. 1943 Oct. v. 9. No. 10. 57-68. 1 fig. [11 refs.]

BOOK REVIEWS

EDGE P G [Lecturer in the Division of Epidemiology and Vital Statistics London School of Hygiene and Tropical Medicine (University of London) etc] *Vital Statistics and Public Health Work in the Tropics* Foreword by Major GREENWOOD D Sc FRCP FRS etc] pp xii+188 1944 London Bailliere Tindall & Cox 7 & 8 Henrietta Street W C 2 [12s 6d]

In this book the main preoccupation of the author is not with the mathematical and statistical assessment of figures concerned with disease in the tropics but rather with the methods of collecting information which may ensure so far as is possible that the data assembled are sufficiently accurate and complete to permit conclusions to be drawn on which sound public health measures may be based. The reviewer once had the privilege of hearing a lecture by Sir Almroth WRIGHT on the logic of medicine in which the speaker explained that logical processes are not difficult in themselves given reliable data and that the primary business of the medical man was to make sure of his facts. Edge adopts much the same point of view in relation to the tropical countries and naturally lays stress on the British Colonial Empire.

It is of course well known that the demography of tropical countries is poor and that in spite of the powers given by enactments to the governments of these countries the processes of registration of the peoples are inadequate. Of the many causes of unreliability in the figures which exist the chief are perhaps the poor state of education (judged by European standards) the comparatively small provision of civil servants whose duties are multitudinous and the endless and unexpected taboos which possess the native mind. It is with such problems and with the necessity for their solution that the author deals with the authority given not only by many years of scrutiny of Colonial Medical Reports (familiar to readers of the *Supplements* to this *Bulletin*) but also by experience gained in the field.

In the early chapters the importance of public health book keeping some of the difficulties encountered in the tropics and the primary requirements of organization are dealt with. Methods of counting or estimating the size of populations are detailed and the complexities of birth registration especially in relation to local beliefs and superstitions are explained. The author makes a plea for the collection of more complete and reliable records of sickness than are at present available and discusses the importance of nomenclature in relation to records of disease. He gives a list of 85 titles of diseases which may serve as a basis for the compilation of local lists these titles are related to those in the International List of Causes of Death.

In the final chapter the author drives home his point that in post war reconstruction population studies will be necessary as a basis for the solution of health problems and that these must be founded on carefully ascertained facts. Medical officers in tropical countries and administrators who plan demographic studies would be well advised to read this book with care it will save them many mistakes. Many of the students who have passed through the author's hands will welcome this explicit statement of the lessons he inculcated in his lectures and not a few of those who have sought and acted upon his advice before commencing field surveys will corroborate the wisdom of his teaching.

Charles Wilcocks

NAUSS Ralph Welty [B.Sc. M.D. Dr. P.H. etc.] *Medical Parasitology and Zoology* Foreword by John C. TORREY Ph.D. Professor (Emeritus) of Epidemiology Cornell University Medical College pp. xix+534 95 figs (1 coloured) 1944 London & New York Medical Book Department of Harper & Brothers Paul B. Hoeber Inc. 30s.]

From the foreword it is made clear that the object of this book is The presentation of the essentials of medical parasitology and zoology to the prospective practitioner of medicine. The author Dr Nauss is Assistant Professor of Public Health and Preventive Medicine at Cornell University, and many years of research and teaching in the subject of parasitology have well fitted him for the writing of a text book intended for the guidance of medical undergraduates. In the foreword and preface it is stated that parasitology is taught to second year medical students at Cornell in a separate short course of ten sessions of three hours each. Dr Nauss apparently considers that this period is inadequate for so important a subject for he states: "Although we have been able to teach in the manner outlined something of the rudiments of these subjects in the thirty hours of class time available it seems obviously a handicap to both instructor and student to be obliged to do so. A more consistent relative rationing of the students' time devoted to the basic medical sciences would undoubtedly result in the allocation of considerably more time to medical parasitology and closely related medical subjects. Under these circumstances it is obvious that a book such as this containing as it does of some 500 pages must include many references to aspects of parasitology not dealt with in the medical students' short curriculum. The author however has endeavoured to avoid this difficulty by segregating that part of the material which it is not possible to present during class sessions into an appendix and glossary and thus avoid tempting the student to memorizing it."

The book thus falls into two parts. The first part consisting of some 350 pages is devoted to an account of the protozoa, helminths, arthropods, snakes and venomous animals which directly or indirectly adversely affect the health of man. The second part comprising about 150 pages contains an appendix dealing with the technique of laboratory examinations, an excellent glossary and a short bibliography. The result, as might be expected from the work of so experienced an author, is a book well written and stimulating to the reader. In the reviewer's opinion however it fails to achieve its avowed object of providing a text book of parasitology suitable for the use of the medical student for it lacks that accuracy, conciseness and rigid attention to essential which renders Blacklock and Southwell so popular while it fails to contain the wealth of reliable information which makes larger volumes such as Craig and Faust so valuable as works of reference. Furthermore brevity is sometimes achieved only at the cost of clearness or by the omission of information which is important for an understanding of the methods recommended for the control of the parasite or its vector while some of the statements made although possibly true are lacking in evidence and are not generally accepted.

The danger of confusion resulting from a determination to achieve brevity is well illustrated in the table on pp. 246-247 which depicts the arthropods concerned in the transmission of disease. In this table

the only arthropod given as a vector of endemic typhus is *Ceratophyllus fasciatus* although later in the book an account is given of *Trombicula akamushi* as a vector of Japanese river fever which is stated to be probably caused by a rickettsia. The cause of Texas fever is given as *Babesia lipemina* transmitted by *Margaropus annulatus* and no explanation is furnished as to why these obsolete names are used or why a disease of cattle is included in a list of human ailments. *Stomoxys calcitrans* is listed as a possible carrier of relapsing fever. Most puzzling of all *Cimex* sp is stated to carry plague typhus fever relapsing fever kala azar. It is true that an explanation of this latter statement and of some other points is made later in the text (p 307) but the book is intended for medical students who are apt to interpret the written word as a statement of literal fact. Minor inaccuracies are not uncommon. Thus the statement is made (p 212) that the oncospheres of *Dipylidium caninum* are ingested from the hair of the dog by flea larvae of the genus *Culicoides* (p 277) the larvae are said to be frequently called blood worms because of their colour and on p 315 is the statement that the chief medical interest in fleas is their transmission of bubonic and septicemic plague. Such errors are in the nature of slips but they are nevertheless misleading.

As regards the omission of important relevant information the following may be quoted as examples. The reviewer has failed to find any reference to the technique to be employed in preparing ordinary thin blood films or to the making and staining of thick films nor is any account given of mosquito dissection or of the method to be employed in the preparation of fresh films for the detection of trypanosomes or microfilariae. Yet all these are points of great practical importance to the student. The account of the louse and of louse borne diseases is disappointing and in a book published in 1944 it is surprising to find no mention of modern methods of control and no reference to the value of prophylactic inoculation against fevers of the typhus group. Equal parts of kerosene and vinegar are recommended as a means of eradicating the head louse and it is stated that

Ordinary laundry is effective in destroying the eggs of the body louse which is described as laying her eggs on fibres of cloth no mention being made of the fact that she also lays them on the hair of the body and that this represents the chief difficulty in control. A minor omission regarding the vectors of disease is that although the life cycles of *Fasciola hepatica* *Clonorchis sinensis* *Paragonimus westermani* and *Fasciolopsis buski* are described in some detail neither the name nor the habitats of the respective molluscan hosts are mentioned—an important hiatus when control is being considered. A similar absence of information regarding treatment is sometimes apparent. Thus although the therapy of malaria is discussed at some length no reference is made to the use of intramuscular quinine and the only treatment recommended for scabies is the Application of sulphur ointment (5 per cent in lanolin) at intervals of three to four days. Mosquito repellents are discussed but no mention is made of recent discoveries which have proved more successful than those mentioned by the author.

The following extracts taken only from that section of the book which deals with malaria may be quoted as examples of the reviewer criticism that some of the statements made by Dr Nauss although possibly true are lacking in evidence and are not generally accepted. Writing of *Plasmodium malariae* it is stated (p 98) that Shuffner's dots of tertian malaria or Maurer's dots of subtertian malaria are

rarely present (Ziemann's stippling). The suggestion here is that Schuffner's dots or Maurer's dots may occur in cells infected with *P. malariae* but no evidence is brought forward to support this unusual statement. On p. 107 we find *P. ovale* included among several malaria plasmodia of less certain or doubtful status reported for man. This classification seems scarcely justifiable since no *advars P. ovale* is almost universally regarded as a distinct human species. On p. 109 when writing of the infection of anophelines the author states that other factors which may be of importance in the transmission are the age of the gametocyte and possibly inherent qualities of the ingested blood or the condition of the mosquitoes at the time of ingesting gametocyte infected blood. These factors may be important but their importance has yet to be demonstrated. The following quotation is the first of three paragraphs describing blackwater fever (p. 117):

Blackwater fever occurs almost exclusively among Caucasians who have lived in tropical malarious regions for prolonged periods and who have suffered repeated attacks of malaria. Its etiology is uncertain but many investigators associate the condition with the previous history of malaria although plasmodia may be absent or scanty during an attack or in the internal organs after death. Blood hemolysis occurs extensively in numerous casts being found in the renal tubules and hemoglobin in the urine. Some authors attribute the hemolysis to long continued use of quinine in the treatment or prophylaxis of malaria but blackwater fever also occurs in untreated cases. Few doctors with tropical experience would agree with the use of the words "almost exclusively" Indians coming to West Africa seem as prone to blackwater as Europeans while the present war has shown that many cases of blackwater occur after only a short residence in the tropics. The statement that many investigators associate the condition with a previous history of malaria implies that some do not but surely these authorities attribute blackwater to long continued use of quinine in the treatment or prophylaxis of malaria. It could be more generally accepted if phrased "blackwater fever also occurs in cases treated with drugs other than quinine."

Two pages further on (p. 119) Dr. Nais writes: "The most reliable method for making an accurate diagnosis of malaria fever is by the demonstration of specific plasmodia in the blood or in material obtained by splenic puncture. This statement appears to attach an unwarrantable and dangerous importance to the value of spleen puncture as a means of diagnosing malaria. On the same page occurs the statement which in some respects appears to surpass quinine. These therapeutic agents are plasmodium and atabrin. In writing of the former drug he remarks (p. 127): "Relapse occurs less often after its use than after the administration of quinine. The reviewer knows of no reliable evidence in support of either of these statements when recommended that are here in a general sense. On the same page it is recommended when gametocytes are present (and presumably gametocytes are present in every case of malaria) plasmodium should be administered. After the symptoms have been controlled with quinine it is considered good practice in every case to administer plasmodium in doses of 1/6 grain (0.01 gm.) three times a day for a period of five or six days. The usual treatment with quinine being continued at the same time. That treatment with plasmodium is sometimes advisable is not denied but

that every case should be so treated is not in agreement with present ideas. Writing of quinine prophylaxis Dr Nauss states (p 126)

The principal objection to its employment in this way is that protracted administration of the drug may induce quinine fastness of the strain of plasmodia harboured. Thus the individual will benefit less from its use as a curative agent. Comment such as this coming from an authoritative source is bound to prejudice the medical undergraduate against the use of prophylactic quinine and it should not be made unless supported by good evidence. In this case so far as the reviewer is aware no such evidence exists.

Printer's errors are few but the following have been noted p 76 Stevens for Stephens p 246 Aganthocheilontema for Acanthocheilonema p 287 *Glossinae palpalis* for *Glossina palpalis*. Schuffner is spelled Shuffner throughout.

The book is profusely illustrated and there is an excellent colour plate depicting the malaria parasites. The majority of the illustrations have been borrowed from other writers for the most part these have been selected with care but some notably those of the bed bug the louse and *Sarcoptes scabiei* are either poor in original quality or have suffered in reproduction. The book is finely printed and bound and a comprehensive index has been provided. The cost in America is not stated but apparently it is sold in Britain for thirty shillings.

R M Gordon

TAREEV E M [Clinical Malaria] 299 pp With 37 charts and figs [In Russian] 1943 Moscow State Medical Publications of People's Commissariat of Health U S S R [12 Roubles]

The author who is Director of the Clinical Departments of the Central Institute of Malaria and Medical Parasitology in Moscow (former Institute of Tropical Medicine) and of the Third Moscow Medical Institute has produced a monograph on malaria which provides a systematic account of the pathogenesis, symptomatology, clinical course, diagnosis and treatment of this disease. In accordance with the special prominence given to the clinical aspects of malaria questions of aetiology and epidemiology including mosquito control have been purposely left out of consideration.

An Introduction dealing with the history and world incidence is followed by a general account of malarial infection in Chapter 1 containing a description of the course of the three main types of malaria with special reference to primary attacks, relapses and protracted forms. Tareev denies the existence of chronic malaria and regards all protracted forms as due to reinfection. Further a clinical classification of malarial infections is given followed by a detailed account of immunity in this disease including host-parasite relationships, course and duration of the infection (stated to be on the average one year in subtertian, two years in benign tertian and from three to five years in quartan malaria) and the mechanism of immunological reactions. The peculiar nature of anti-malarial immunity as compared with immunity to other acute infectious diseases and its bearing on chemotherapy and epidemiology are also considered. Chapter 2 entitled 'The fundamental clinical triad' is devoted to the changes produced by malaria in the spleen, liver and blood and to the relevant methods of diagnosis and determination such as examination of the spleen, splenometry and haematology. There is also a section on changes in metabolism in the course of the disease with special reference to

lipoids such as the acid alkali balance protein content of the plasma etc. Chapter 3 deals with the effect of malaria upon other organs and tissues such as the skin, lungs, cardiovascular system, kidneys, gastro-intestinal tract, nervous system and sense organs including the effect of various chemotherapeutic agents upon the last two. Special forms of malarial infection are considered in Chapter 4 in which detailed accounts are given of benign, tertian, the occurrence including a fulminating type of Blackwater fever and induced malaria are also of which in Russia has recently been brought to notice (see this Bulletin 1943 Vol. 40 436-668). Chapter 5 is on diagnosis and prognosis (including congenital infection). Chapter 6 is on diagnosis and prognosis of malaria descriptions are given of various diagnostic methods (parasitological, serological and clinical) of the differential diagnosis on the one hand from other specific fevers and on the other from various forms of splenomegaly (systemic and local). This chapter is concluded by a section on prognosis of malaria including its economic importance. The last Chapter (6) is devoted to drug prophylaxis and treatment of malaria. The author first describes the chemical composition and mode of action of the various drugs in use especially of some Russian preparations such as acridine (=atebrin, mepacrine) and plasmodicide (=rhodoquine). He then goes on to the methods and courses of treatment (prophylactic and therapeutic) with these drugs and with quinine. It is interesting to note that good results have been obtained with a Soviet quinine preparation known as Sovchinet which is extracted from the entire young plants of *Cinchona succirubra* now cultivated in Transcaucasia.

For many of the examples quoted in the text the author has drawn upon his own observations. There are a few illustrations but unfortunately their value is lost owing to faulty reproduction. There are no references although—curiously enough—in the preface the author mentions a list of bibliography at the end of the book and there is no alphabetical index.

This monograph gives a complete and up-to-date account of the clinical aspects of malaria and will no doubt prove to be a useful guide for Russian physicians and malarologists as well as for those of their foreign colleagues who are conversant with the Russian language.

C. A. Hoare

BOIX BARRIOS J. *Kala azar infantil* [Infantile Kala azar]. Primera Edición 110 pp. 3 maps & 8 figs. 1943. Madrid. Ediciones Vorata.

In 1940 the author published a long article on the subject of infantile kala azar with particular reference to the cases occurring in Spain (this Bulletin 1943 Vol. 40 p. 23). The title book now under review covers the same ground in fact it appears to be largely a reprint of the article in book form. The author has had a considerable experience of the disease in Spain having had under his own observation 117 of the 507 cases which have been noted in the Province of Castellón. The information given on all aspects of the subject appears to be reliable so that those who wish to have a clear picture of infantile kala azar in the Mediterranean area cannot do better than procure the author's useful little book.

C. M. Wenyon

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MEDICAL ORGANIZATION AND DISEASES OF THE NETHERLANDS EAST INDIES

BEFORE THE JAPANESE INVASION

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The total population of the Netherlands East Indies was 60 727 000 in 1930 and by 1938 had it was estimated increased by about 4 000 000. In Java and Madura alone there are 42 000 000 inhabitants concentrated to a density of 314.5 per square kilometre. In other and larger islands the population is much less dense but Bali and Lombok are relatively closely populated.

ORGANIZATION

The medical services date from the time of Bontius (1592-1631). There is now a large public health service which works in active cooperation with the military medical service, the missions and local administrative bodies. There are also many private practitioners in the towns and on the big estates. It is the view of the Government that curative medicine belongs properly to the sphere of private enterprise and of the local administrative bodies.

By 1936 there existed the following medical institutions—500 hospitals of various sizes, 15 asylums for the insane, 42 leper colonies, 6 sanatoria for tuberculosis (since increased to 10) and 970 dispensaries. Many of these are administered directly by the Government Medical Service, many by outside bodies with subsidy from Government and many by purely private enterprises.

For the training of medical men there are two Medical Schools, one at Batavia and one at Sourabaya, and there is a school for dentists. At these institutions natives graduate—in 1936 there were 363 medical students including 16 women—the graduates practising in the Netherlands Indies and forming the greater part of the medical services there.

The auxiliary staffs of the medical department are trained at many places. There are 18 categories in all from nurses of many grades to midwives, malaria and plague assistants, vaccinators, laboratory technicians and subordinate employees.

In the public health service and that of the native States there were in 1939 170 physicians 325 native doctors 16 other medical officers and 24 semi-official doctors. In private practice there were 576 physicians and 163 native doctors. In addition there were 163 military medical officers of whom 57 worked with the public health authorities. Dentists in private practice numbered 157. There were 87 European and 1 209 native nurses and 476 vaccinators 55 technicians and 12 pharmacists while 372 pharmacists were privately employed.

For the large population of these islands this medical organization is still far from adequate but as time goes on the service will increase as more natives graduate from the medical schools.

Hospitals fall into three classes—those controlled by Government those administered by private bodies with Government subsidy and those controlled solely by private enterprise. The three largest Government hospitals are at Batavia (1 000 beds) Samarang (1 000 beds) and Sourabaya (643 beds). Of the subsidized hospitals the Petronella hospital in the Djokja district is one of the largest. It is surrounded by daughter establishments which are in close touch with it by telephone and travelling clinic.

Under the direction of the public health service are the Pasteur Institute and Government smallpox institute Bandoeng at which all kinds of vaccines are prepared. The medical laboratory at Batavia is also the headquarters of the malaria control organization and there is a laboratory at Bandoeng which deals especially with problems of rat analysis. There are four quarantine stations.

Maternity and Child Welfare centres are established at several places. The number of confinements supervised by midwives is steadily increasing and in 1939 amounted to 22 770. In Batavia almost two-thirds of the deliveries are conducted by trained men.

There are 76 pharmacies under the care of trained men. In spite of the long association of the natives with the Dutch they still retain a large measure of distrust of western medicine and a deep faith in their own healers. To counteract this distrust instruction in the elements of hygiene is given in schools but there is also a bureau for popular health literature which has produced booklets on hygiene and pamphlets on hookworm cholera eye diseases scurvy rabies beriberi maternity and child relief and other subjects. Many of these have been sold and others are available in the People's Libraries.

INSECT BORNE DISEASES

Malaria—As in all tropical countries malaria is the commonest disease and constitutes the most important public health problem. Before passing on to the distribution of malaria and its relation to the species of *Anopheles* indigenous to these islands it is well to consider the general position. Malaria causes more deaths than any other disease and is so widespread that there can be few persons except young children living between sea level and the highlands at 5 000 feet who are not affected at some time. In the endemic areas the disease causes high infant mortality though the birth rate is not particularly low and in these areas the general death rate at all ages is higher than in those places where malaria is less prevalent. The general death rate is about 20 per 1 000 per annum. The rate in the endemic areas (where the disease is rife) may rise to 25–50. It reached 400 in the

Cheribon Regency during an epidemic in 1917. It is stated that the malaria death rate is higher in towns than in the rural areas.

In the Dutch East Indies malaria is particularly intense in the coastal districts where it is transmitted by *Anopheles sundaicus* (*A. ludlowi*) a species which breeds in brackish pools open to the sun for instance where mangrove growth has been cut and in lagoons and brackish fishponds. This mosquito breeds in association with certain algae which float on the surface of the fishponds. A fresh water form is found in the interior of N Sumatra. *A. sundaicus* is always dangerous; it attacks man readily and in a series of examinations of over 20 000 specimens a relatively high proportion have been found infected. *A. sundaicus* is not found in Celebes where the brackish water breeder is the relatively harmless *A. subpictus* (*A. rossii*). Coastal malaria is also transmitted in some areas by *A. umbrosus* which is also found in the interior of Borneo and in the island of Banka.

In the inland plains and mountains malaria is transmitted by *A. aconitus* a species which breeds in rice fields fresh water fish ponds canals and occasionally in streams. In rice fields the breeding is largely seasonal taking place after the cutting of the rice when the fields cannot run sufficiently dry to prevent it. Improvement in the drainage of such fields has however reduced this seasonal breeding to such an extent that not only has the general death rate been lowered but the natives who because of the unhealthiness of the districts had begun to leave have returned. In the mountains the important mosquitoes are *A. minimus* which breeds in the grassy waters of streams and *A. maculatus* which is found in streams left open to the sun after the felling of jungle trees. In this respect the malaria caused by *A. maculatus* is man made and must be taken into account in the agricultural development of the country. It may be prevented by leaving the stream shade intact.

In Celebes some malaria is transmitted by *A. subpictus* which may breed in the same manner as *A. sundaicus* though it is not so dependent on surface algae but which may also breed in fresh water.

These are the principal vectors of malaria in these islands but there are others which though less important still play a part in transmission. Of these *A. hyrcanus* breeds in the swamps of S Sumatra and W Java in canals and rice fields. *A. kochi* in pools streams and rice fields and *A. leucosphyrus* in shaded pools.

The mosquitoes so far referred to are found in Sumatra Java and Celebes and the smaller islands near but in the eastern part of the archipelago the mosquito fauna is quite different. Here in New Guinea and the surrounding islands the vectors are — *A. punctulatus* which breeds in almost any collection of water open to the sun such as drains tins boats footprints clear or turbid water but not in streams. *A. punctulatus* var *moluccensis* which breeds in similar waters and also in large rivers. *A. barbirostris bancrofti* which in the interior of New Guinea breeds in shade along the banks of small lakes.

It is therefore evident that malaria can be transmitted widely throughout the Dutch East Indies but as has been stated the distribution is not uniform. On the coast it is general and constant inland the incidence depends on factors such as the clearing of hill streams the cultivation of rice or the presence of swamps or hill streams. It may therefore show seasonal variations of great importance and unusual conditions of rainfall may by creating breeding places in abundance so increase the number of mosquitoes that malaria may be spread in

epidemic form. This is particularly the case in the areas where transmission is not normally equal all the year round and where the state of immunity of the population is not high.

The three common forms of malaria—benign tertian, malignant tertian and quartan—are found throughout. It is the malignant tertian which is the most serious and which causes the highest mortality. Blackwater fever, a sequel of malignant tertian, is found sporadically.

Control measures vary with the habits of the species concerned. For *A. surdanicus* breeding in salt water fish ponds, very efficient control is obtained by draining once each month. This kills the surface algae on which the mosquito larvae depend. To avoid destroying the fish (which are bred for food) ditches are dug round the ponds into which the fish may retreat during the process of drying of the fish pond proper. Fresh water fish ponds are either dried out and converted into rice fields, or are stocked with small fish which prey upon the mosquito larvae. In the rice fields breeding takes place shortly after the cutting of the rice. For control the fields are planted all at the same time and after reaping, are completely dried. In the earlier stages of flooding the rice fields are allowed to remain wet for nine days and then dried for two days, the cycle being repeated. Irrigation water is carefully controlled and the channels so constructed that high backwaters are avoided.

In the hills where *A. maculatus* may breed, control is effected by maintaining the shade of natural vegetation along the streams.

In recent years there has been an increase in malaria in those areas in which the house improvement campaign for the suppression of rats (and therefore of plague, see below) has been pressed. The reason for this is that in the process of house improvement breeding places are created—small pools and puddles—where earth has been taken unless great care is exercised. Much of the house improvement is done by the natives themselves and supervision from the point of view of malaria is not easy.

Plague.—In the Dutch East Indies plague has been present since the great eastern pandemic of 1894 but from Sumatra and Celebes it soon disappeared. In Java it still persists and has risen and fallen in great epidemics at least three of which occurred in 1913-15, 1920-21 and 1932-36. In the inter-epidemic periods moreover considerable numbers of cases have been reported. In the earlier years the epidemic foci were in central and east Java; in the later years in west Java. The known deaths from plague during the period 1911-36 numbered 707,666.

In Java a human plague is almost exclusively a disease of the natives whose houses are infested with rats. It is found predominantly in the hill country above 1,600 feet especially at the beginning of the rainy season in December and January. Bubonic plague is as in other countries the commonest form. In Java the case mortality from this form is very high, usually from 60 to 100 per cent. Plague pneumonia may arise in the course of bubonic plague; the sputum is laden with bacilli and these are expelled into the air by the patients in the acts of coughing or even talking. There is great danger that persons in contact with these patients will contract the disease through the inhalation of droplets of sputum expelled by the patients. Pneumonic plague is invariably fatal. It is found in Java in small outbreaks of 2 to 10 cases and accounts for 6-8 per cent of the total plague cases seen.

The rats affected are the brown Malayan house rat *Rattus rattus diardii*, *Rattus concolor* inland and to a very small extent *Rattus*

norvegicus the brown sewer rat. The principal flea involved is the tropical rat flea *Xenopsylla cheopis* notorious in this respect throughout the tropics.

In Java control measures fall into two categories—measures of rat control and protective inoculation. Rat control in ports follows the usual procedure—fumigation of ships, quarantine and construction of rat proof godowns and stores. In the country districts where the majority of cases are found the Dutch have instituted the campaign of house improvement which has as its object the alteration of existing houses or the construction of new houses in such a manner that facilities for rat nesting are eliminated. To this end double walls are abolished so that rats may not nest in the space, bamboos used in building are sealed at each end for the same purpose or replaced by wooden beams, the use of tiles to replace thatch is encouraged and regular inspections are made. The Dutch have carried out this campaign without compulsion but with the aid of a small bonus for each completed house and report astonishing success. By the end of 1938 no less than 1 525 364 houses had been improved. The unexpected effect of this activity in causing an increase in malaria has been referred to above.

Preventive inoculation has been developed in an unusual manner. The Dutch bacteriologist OTTEN some years ago isolated a bacillus presumably a plague bacillus of such feeble virulence that it could not even in the living state provoke the disease in small animals. It was found that this organism similarly failed to produce ill effects when injected in man and that the protective power against plague developed in animals was greater after injection of suspensions of these living bacilli than after the injection of killed vaccines. This method of inoculation with the living vaccine has been applied in Java on a massive scale since 1934 and by 1938 over 7 000 000 persons had been so immunized. The Dutch have great faith in this measure and certainly since it was instituted the epidemic wave of plague has steadily and steeply declined.

The typhus group of fevers is represented in the islands by mite fever (tsutsugamushi disease) in which the causative organism is transmitted from rodents to man by the larvae of scrub mites and by endemic or murine typhus—a disease of rats spread to man by rat fleas. Mite fever now regarded as identical with the scrub typhus of Malaya and Japanese river fever is commonly contracted in scrub country and may particularly be expected in groups of labourers engaged in clearing bush. It is seen especially in northern Sumatra and New Guinea though a few cases have been reported from Java and W. Borneo. The incidence is not high in peace time about 500 cases are reported each year from N. Sumatra. The mite incriminated is the larva of *Trombicula deliensis* but it has been surmised but not proved that ticks of the genus *Amblyomma* may also transmit the disease.

Murine typhus is seen in Java. It is not so fatal to rats as plague and there is not therefore the same tendency for fleas to seek human hosts. It is for this reason unlikely that murine typhus would cause extensive outbreaks in man though in Shanghai and Mexico this form has been transmitted to man and has then spread in epidemic fashion from man to man through the human louse.

Dengue fever is stated to be generally distributed through the islands. It is transmitted by the mosquito *Aedes aegypti*. This mosquito in

Africa and South America is the transmitter of yellow fever and though yellow fever has never been found in the Far East the probability of its wide spread should it be allowed to enter is not in doubt

INFANT MORTALITY HOUSING NUTRITION WATER SUPPLIES

The *infant mortality* of Batavia has been carefully studied. In the period 1934-36 there were 12 000 native infant deaths representing 300 per thousand of the live births but in the poorest native class the rate may be almost 500. In the Chinese the rate was 150 in the Europeans 60 in the same period for comparison the Amsterdam rate of 30 is quoted. The native rate is one of the highest reported from tropical cities.

The first three months of life are the most critical the causes of death are many but malaria is regarded as one of the most important. No doubt as in other primitive communities infant diarrhoea and congenital syphilis are also important.

Houses are made usually of wood bamboo and palm leaves but brick is used for the larger dwellings. Doors and windows are insufficient to provide adequate light and ventilation. Overcrowding is not common in rural areas but occurs in towns.

House improvement is therefore desirable but is only considered urgent when there is direct danger of disease as in the case of plague. The Government supports schemes for good housing by giving financial help and by expropriating land for building.

The *nutrition* of the natives is not good their diet consists largely of carbohydrate foods is poor in fats and contains little animal protein though there is a considerable amount of vegetable protein. Rice is the staple food and is largely cultivated. The peasants use a crude form of husking in which the pericarp and embryo (i.e. those parts of the grain which contain vitamin B₁) are not removed. This rice is therefore satisfactory but in other communities the practice of eating polished rice is common.

Maize is used in some areas but in parts of Java it is the custom to remove the pericarp and give it to the poultry and to wash the endosperm in running water for three days a process which removes the vitamin B₁. In Madura however the pericarp is eaten as porridge with good result. Other starchy foods are sweet potatoes (which contain vitamin A) cassava sago (in Ambouma and the Moluccas) and cane sugar. The Government encourages the cultivation and use of soyabean. Peas and beans (gram) are extensively eaten and provide protein (but the djenkol bean sometimes causes damage to the urinary system see this *Bulletin* 1936 35 724 1941 39 490). Vegetables of several kinds are grown and are commonly taken as soup.

A considerable amount of fish is eaten in coastal districts but milk meat and egg are little used except by the wealthy or at feasts. Some animal protein however is eaten in the form of bee larvae grasshoppers frogs and snails which are appreciated by some of the natives. Coconut oil and ground nuts supply fats and the latter contain vitamin B₁. Chillies rich in vitamin C are used.

Two native foods may give rise to fatal poisoning they are prepared by allowing moulds to act on ground nut cake (Ontjom) and coconut cake (Bongkrek).

Fruits are usually eaten raw and include the egg plant the Goa bean and the mango.

The use of tea and coffee is general

The diet of the native population is deficient in several respects sometimes it is deficient in quantity and hunger oedema is not unknown though it is rare But the more widespread deficiencies are not of bulk or quantity of total food but of the vitamins deficiency in vitamin A is perhaps the most common

Deficiency of vitamin B₁ is reflected in the disease *beriberi* which though it does not now occur in the epidemic form it once assumed is still seen and paradoxically is often found in the wealthy It is a disease particularly associated with the eating of polished rice or of sago and only affects those taking a diet more than two thirds of which consists of carbohydrate It is seen in cities where imported rice is eaten it is not common in rural districts where the natives only partially clean their rice It was common during the years of the rubber boom when agriculture was neglected and rice was imported into Sumatra In Chinese women it is seen during pregnancy in an acute form and is due then to the custom of feeding on a diet almost exclusively of polished rice It tends to break out when maize crops and fishing are poor and when the people are thrown back on to a diet too exclusively composed of rice

Treatment with preparations of concentrated vitamin B₁ is effective but the essence of the problem of this disease is prevention which resolves itself chiefly into the elimination of polished rice with the substitution of red or partly polished rice The Government encourages the cultivation of leguminous plants and the distribution of red rice and green gram all rich in vitamin B₁ In controlled populations for instance in prisoners the use of polished rice is not permitted In 1939 beriberi caused 3.41 per cent of deaths in hospital

Pellagra is seen sporadically usually in those who suffer from chronic intestinal disease in this case the essential fault is probably inability to absorb the vitamin which may be present in the food

There is no evidence of deficiency in vitamin C in the rural population and scurvy is not seen in them *Rickets* is not reported Of all the vitamin deficiencies that of vitamin A is probably the most common

Deficiency of iodine in water and food is observed in the mountainous regions of Gayo Loeos the Dieng plateau Kediri and Bali In these districts goitre is common but the general health of the people is not seriously affected

In general the natives have excellent teeth

The water supplies of the rural population consist of rivers streams wells and collections of rain water and are not usually controlled They are therefore dangerous and are the means of transmitting intestinal diseases But there are 281 plants for the supply of good and protected water 138 of which exist in Java In Sourabaya the controlled supply was instituted in 1903 in Batavia in 1922 In both the result was a decrease in the incidence of typhoid fever

The provision of safe water is one of the chief measures necessary to good health In the Dutch East Indies rivers and streams in addition to providing drinking water receive the refuse of man and animals the danger is evident Wells are usually shallow and receive not only contamination introduced directly from the hands or feet of the users or from utensils employed but contaminating material deposited on the ground nearby which may either be washed directly into the water or may reach it by percolation through the soil

The disposal of *sewage* on a large scale is possible only in the larger towns. Elsewhere cesspit, septic tanks or pit latrines are used but in the rural districts the natives commonly defecate into streams or indiscriminately on the soil. It has already been pointed out that water for drinking, taken from streams and that wells may be contaminated with material from the surface of the ground in the vicinity. They may also be contaminated by percolation from cesspits. The diseases caused by such contamination will be dealt with below.

In some places a solution of this problem is sought in method whereby excreta are collected and by a system of composting are converted into a manure which may be used to enrich the soil. When properly carried out this method is harmless and during the process of composting which consists of packing the excreta and maintaining it in a moist condition together with vegetable refuse the organisms which are associated with human disease are destroyed by the heat spontaneously generated in the mass. After a few weeks the material is converted into an odourless compost of high agricultural value.

This process may be exceedingly useful but for success demands careful attention to the details of routine in periodical turning of the mass and therefore the human factor is involved. In China and neighbouring countries human faeces are used as a fertilizer without any treatment and have acted as a potent agent in the spread of disease. Efficient composting is safe from this danger but it is not difficult to imagine that a native who is on the one hand warned of the danger of spread of disease through human faeces and on the other is taught that the same excreta can after undergoing a simple process safely be used in the cultivation of human food may be somewhat confused.

The disposal of refuse is a problem only round the towns since rural refuse is easily burned. The dustbin system is used in towns and refuse is dumped in the manner adopted in Europe. Stable refuse however presents a problem as yet unsolved in many places.

INTESTINAL DISEASES

Cholera has in the past swept through the Netherland Indies as it has through all the neighbouring countries. In 1910 there were 64 733 deaths from this disease in 1914 just over 1 100 in 1918 almost 10 000 but in 1920 only 17. From 1923 to 1934 there were only 17 known cases.

Cholera is transmitted through the contamination of food or drink with faecal matter or by direct contact with patients or through the intervention of flies. It is particularly connected with water supplies and contaminated water from wells and rivers has in the past played the chief part in the enormous epidemics which have taken place in the East. The protection of water is therefore probably the most important step which can be taken in the prevention of this disease. Though this has been effected in many places in the Netherland Indies it has not been possible in most rural districts and to control the disease the public health authorities have in the past resorted to mass inoculation with cholera vaccine together with strict control of immigrants and pilgrims. It is not easy to determine the efficacy of each of these measures but the fact remains that in the last 20 years the true classical cholera has not presented a serious problem though in view of the fact that it is constantly seen in India Indo-China and China there is always the possibility of its reintroduction.

In 1938 however a disease broke out in Celebes which was indistinguishable from cholera but which on investigation proved to be due to a vibrio apparently identical with that found in pilgrims at El Tor on the Red Sea. This El Tor vibrio had never before been found capable of producing disease in man but there was no doubt of its effect in Celebes where cases were found up to 1940 though the outbreak was not large.

Typhoid—In Batavia the cases of typhoid in 1927 were—Europeans 6·7 per 1 000 of the population natives 1·1 Chinese 3·8. This high rate in Europeans indicates the danger they run. In 1937 there were about 5 000 reported cases of true typhoid in the Netherlands Indies and in addition there were 946 cases of paratyphoid A. Inoculation against these diseases should be insisted upon by Europeans.

Bacillary dysentery affects all ages but is common in children; this disease and infant diarrhoea are responsible for a high proportion of infant deaths in all tropical countries. Dysentery is constantly present but increases to epidemic proportions from time to time. About 70 per cent of the cases are due to the Flexner group of organisms and the disease is relatively mild but the severe Shiga type is also found especially in the Bantam region. In Java and Madura in 1939 there were 5 031 cases of bacillary dysentery with 536 deaths but these are only the known cases—many others must go unrecorded. This disease causes about 4·5 per cent of all hospital deaths.

Amoebic dysentery is much less acute. It is found in many parts but epidemics rarely occur.

OTHER DISEASES

Of the diseases caused by worms *Hookworm infection* is the most widespread in the Netherlands Indies. The common species of hookworm is *Aecator americanus* which is found in 91·8 per cent of cases the remainder being due to *Ancylostoma duodenale*.

A consideration of the life history of the worm makes it clear that spread is a question of bad sanitation. Natives usually deposit their excreta at any convenient spot and commonly choose shady bushes for the purpose. Plantations offer many opportunities for this practice and moreover the conditions of shade, temperature and moisture are favourable to the larvae. Further it is in just these places that natives walk barefoot offering to the larvae the bare skin necessary for their entry into man. On the other hand faeces deposited in deep pit or bored hole latrines are harmless though from shallow pits the larvae may be able to reach the ground surface. Latrines whose edges are fouled with faeces however are dangerous because bare feet are constantly placed well within range of the larvae and larvae are attracted by the warmth of human skin.

In the Netherlands Indies hookworm infection is widespread in the rural districts where 80 to 90 per cent of the natives may be affected but fortunately the average number of worms is not high. This means that although minor disabilities no doubt exist serious illness is not common. This may be a result of the measures of control which have been taken and which consist of campaigns to encourage the construction and use of proper latrines and of the fact that most hospital patients in addition to being treated for their primary illness are treated by one of the drugs efficient in the elimination of hookworms. It has

been observed that there is a marked decrease in the incidence of this infection where intensive sanitary work has been carried out.

The combination of hookworm infection and malaria gives rise to a condition of severe anaemia frequently found in some districts.

Other intestinal worms are common but are less important. Tapeworm infection due to *Taenia saginata* is found especially in Bali. In other places *Taenia solium* is present and both worms are widespread. Infection with these is rarely serious. *Trichinosis* is also found.

Infection with *Echinostoma ilocanum* is found in Java among the insane who live in colonies and in Celebes among the people who live round Lake Lindoe. This worm passes one stage of its life in certain fresh water snails and the second stage either in snails of other species or in fresh water mussels (in Celebes). These snails and mussels are eaten and are often insufficiently boiled so that the larval forms of the worms are not killed and proceed to their third developmental stage in the intestine of man where they reach maturity. The symptoms caused are slight, some diarrhoea and abdominal pain and the infection usually dies out in the course of several months. Round Lake Lindoe up to 96 per cent. of the population of some villages are infected.

Infections with *Ascaris lumbricoides* and *Trichuris trichiura* are common especially in children. They indicate bad sanitary habits but are not often the cause of severe disease.

Filariasis—There are two common filarial worms *Wuchereria bancrofti* and *W. malayi*; the embryo of the latter was first recognized by BRUG in the Netherland Indies. *W. bancrofti* is found in Batavia, the island of Kabaena, Celebes, New Guinea and elsewhere. It is carried by the mosquitoes *Culex fatigans*, *Anopheles sundaicus*, *A. subpictus*, *A. aconitus*, *A. barbirostris* in the more western islands and in New Guinea (where the mosquito fauna is quite different) by *A. punctulatus typicus*, *A. punctulatus moluccensis* and *A. barbirostris bancrofti*. The breeding places of most of these have been indicated in the sections on malaria—control of breeding is not easy.

Wuchereria malayi is found in Borneo, Batavia and elsewhere in Java (especially in the Serajoe delta), Celebes, New Guinea, the centre of Sumatra and other places. It is carried principally by mosquitoes of the genus *Mansonia*. These mosquitoes have breeding habits quite unlike the mosquitoes already mentioned in that the larvae developing in water obtain their oxygen by piercing the roots of certain water plants. This is important because the larvae cannot develop if these plants are not present and removal of the plants is therefore effective in control, unfortunately some of the mosquito species attach themselves to the roots of swamp trees which cannot effectively be removed. The species of *Mansonia* concerned are *M. annulifera*, *M. uniformis*, *M. indiana* and they breed largely in association with water plants of the genera *Ipomoea* and (in some places) *Pistia*. In Martapoera (Borneo) infection was found in 22 per cent. of the specimens of *M. annulifera* and in 6 per cent. of *M. uniformis* examined. It is stated that *Anopheles barbirostris* is a vector of *W. malayi* in Celebes and *Anopheles hyrcanus* in Java.

The percentage of people in whom embryos are found varies from 9.3 in part of New Guinea to 42 elsewhere in that island, from 20 in Kabaena to 24.7 in Celebes, from 11.8 in children in Borneo to 32.2 in adult males in the same area. In a minority of cases however filarial infection produces elephantiasis and other physical disabilities.

Leprosy—It is estimated that there are about 50 000 lepers in the islands and that in some areas the incidence reaches 1-1½ per cent of the population. It is generally accepted that leprosy is a disease transmitted from man to man by direct contact but that in general contact must be prolonged and intimate. For this reason it is a disease commonly transmitted within families.

For the treatment and isolation of lepers there were in 1939 49 institutions in the Netherlands Indies with accommodation for 5 300 patients. The majority of lepers are therefore living at large and to reduce the risk of infection of healthy persons the Government encourages the isolation of patients in separate huts in their own districts. Such isolation is usually only partial but in a disease in which long intimate contact is a feature of infection such partial isolation may have some value.

Tropical ulcers of the legs are general. They arise commonly from trivial injuries and attain their greatest extent in the malnourished. These ulcers may be enormous destroying the tissues down to the bone and even necessitating amputation. They are often found in plantation labourers who are especially prone to the injuries which initiate the process. Much working time is lost through these ulcers and often needlessly so if slight abrasions were at once treated. Many ulcers would be prevented but when once they become large which they do rapidly cure is a lengthy process.

Yaws—In the Netherlands Indies surveys of the incidence of yaws have been made in one of these 20·7 per cent of the population examined were found to be infected 8·9 per cent being in the infective stage but in some villages the rate was as high as 60·3 per cent. The total number of cases in the islands is therefore enormous.

Treatment with the salvarsan preparations is very effective especially in the early stages and the Dutch conduct special and wide spread treatment campaigns. In 1927 731 000 persons were treated and the Government have adopted the policy of demanding a small payment from those who can afford it on the ground that this makes the people appreciate more fully the value of treatment.

Veneral diseases are widespread. It is estimated that 10-15 per cent of the population of Java and Madura between the ages of 18 and 50 are infected with one or other of these diseases. Syphilis has been found in 4·1 per cent of Indo European women in 7·7 per cent of Chinese and in 4 to 6 per cent of native women in Batavia. In general gonorrhoea is found twice as frequently as syphilis. Brothels flourish in the cities and these diseases are much more common in urban than in rural communities. In Batavia 4 to 5 per cent of the children are syphilitic.

Treatment for syphilis is generally available in hospitals but three quarters of the natives who receive treatment do not complete the full course. Further more than half of the infected people do not attempt to undergo correct treatment but rely on the many native quack remedies. It is therefore evident that as in most other tropical countries the syphilis position is unsatisfactory.

The other venereal diseases soft sore lymphogranuloma inguinale and granuloma venereum are seen but are not nearly so common as syphilis and gonorrhoea. In 1937 1 281 cases of granuloma venereum were reported for this treatment with tartar emetic injections is often effective.

Tuberculosis is prevalent especially in towns. The common form is pulmonary.

The extent to which infection has spread is indicated by the results of the tuberculin test in Batavia and rural Java where the percentage of positive results is 10 in infants 35 at ages 5-14 and 68 to 70 in adult life. The number of cases in which infection goes on to disease is of course very much smaller.

That tuberculous meningitis is not rare is shown by the fact that 180 cases were seen in a Batavia hospital from 1932 to 1940. The number constitutes half of the total case of meningitis admitted. These can only be a fraction of the cases actually existing in the population.

During 1939 there were 8 677 patients admitted to hospital in the Netherlands Indies for tuberculosis of the lungs and 1 773 for other forms of the disease. The actual number of cases in the islands must be much higher than the figures indicate. Tuberculosis of the lungs accounted for 10.53 per cent of all hospital deaths and other forms for 1.02 per cent. In a survey of 330 000 estate labourers in Sumatra in 1930 it was found that tuberculosis caused more disability and deaths than any other disease except acute respiratory diseases (for instance pneumonia).

Tuberculosis is therefore a serious problem and probably one of increasing importance and no doubt it is true that the natives do not possess the same standard of resistance as the white races. Other factors influence the extent and spread of the disease especially the habit of over-crowding in the home, the poor state of nutrition of many natives and possibly the presence of hookworm disease and malaria.

To deal with this situation the Dutch have taken certain steps. A tuberculosis study committee has been set up to investigate the position. Instruction in measures of prevention is given in association with the other health campaigns which are conducted for instance the hookworm campaign. There is continuous effort to improve diet and housing conditions. For treatment and isolation of the patients sanatoria have been built 4 by Government and 3 by other bodies while 10 of simpler type are projected. There are 15 consultation bureaux equipped with X-ray apparatus. The sanatoria are so much in demand that they cannot accommodate all the patients seeking admission and a system has been developed under which the owners of houses round the sanatoria take in the patients who receive their treatment at the institution.

Smallpox is not now a serious menace. In 1913 there were 35 000 cases with 8 000 deaths but this high incidence has fallen. In 1927 there were only 400 cases and since then there have been very few. A vaccine institute was established in 1891 and vaccination is now carried out widely and consistently.

Pneumonia is one of the principal causes of death in both children and adults. It is three or four times as common in the natives as in the Europeans and the case mortality rate (30 per cent) is twice as high. In the army it is more important than typhoid and in prisons in Java it occurs in epidemic form. It is thought that the chilling effect of clothing wet with rain has something to do with the frequency of the disease and that other diseases especially malaria predispose to it. Preventive measures in the general population cannot easily be taken but from experience gained in South Africa it would seem that the

avoidance of overcrowding in the sleeping quarters in prisons and barracks may lead to diminution of incidence in those communities

Diphtheria is important In 1939 there were 786 cases with 106 deaths in Java and Madura Cases are also seen in the outer provinces *Scarlet fever* is stated to occur sporadically and *measles* and *chickenpox* are seen *Influenza* is seen every year but occasionally assumes epidemic proportions There are a few cases of *cerebrospinal meningitis* each year and several cases of *infantile paralysis* have been reported *Rheumatic fever* has been recorded

Rabies is reported and in 1932 522 persons were treated through the organization of the Pasteur Institute This does not mean of course that all these persons were actually infected Cases of *rat bite fever* are found from time to time treatment with the salvarsan drugs is effective More important than this is *leptospirosis* primarily a disease of rats and to a smaller extent of dogs and cats it may affect man It is caused by *Leptospira icterohaemorrhagiae* or *L. bataviae* which are present in the urine of diseased rats and which may pass through human skin or mucous membranes In other countries this disease is known as mud or slime fever and is contracted through contact of human skin with mud or water contaminated by rats Thus bathing in contaminated water or working in rat infested sewers may lead to infection In the Netherlands Indies the rats concerned are *Rattus norvegicus* *R. brevicaudatus* and *R. concolor*

The disease in man may be severe and even fatal but on the other hand it may be so mild as to be missed Diagnosed cases are not rare in Batavia and examination of the blood of 150 healthy persons revealed the fact that 39 per cent had at some time been infected

Rhinoscleroma a bacterial disease which affects the nose and throat and which is most common in women aged 20-35 is reported from the Batak lands of Sumatra

Trachoma is frequently seen and is responsible for much of the blindness which exists The incidence varies and some parts of the islands are free from it A campaign of treatment is carried out by specially trained nurses working under an eye specialist

Skin diseases are very common *impetigo* is seen especially in children *tinea in bricata* a skin infection due to a fungus and other fungous diseases are reported quite frequently Infestation with head and body lice is common

All forms of *cancer* are found

Insanity is a condition which has necessitated the institution of four large asylums with 8 000 inmates five observation asylums with 1 100 inmates and seven observation stations with 316 inmates The use of *opium* is widespread but the drug is in general used by moderate smokers and except in a few cases of gross addiction does not present a serious problem Treatment centres for addiction exist There is little *alcoholism*

Stone in the bladder or kidney is not uncommon it has been thought that this condition may be a result of deficiency of vitamin A in the diet

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MALARIA

J NAT MALARIA SOC Tallal a see Fla 1944 June v 3 No 2
 147-50 Report on Malaria Terminology from the Committee on
 Medical Research

The Committee on Medical Research of the National Malaria
 Society suggests that the Society should draw up and adopt a uniform
 terminology in malaria. A glossary has already been given in the
 Report on Terminology in Malaria published by the Health
 Organisation of the League of Nations in its Bulletin Vol 9 No 2
 1940. The Committee disagrees with some of the terms in the glossary
 and thinks that better terms could be used. For example the parasitic
 periods should be designated prepatent, patent and subpatent and
 the clinical periods should be termed incubation, symptomatic and
 latent (?). Induced malaria should be defined as malaria experi-
 mentally contracted and be divided into () blood induced and

(b) sporozoite induced the term malaria should be modified by the specific name of the parasite e.g. *falciparum* malaria instead of aestivo autumnal tropical subtertian pernicious malaria &c

J I Corson

J PARASITOLOGY 1944 June v 30 No 3 206-8 Second Report of the Committee on Terminology of Strains of Avian Malaria [HUFF C G Chairman BOYD G H & MANYELL R D]

LOWE J Some Common Misconceptions of Malaria *Indian Med Ga* 1944 May v 79 No 5 207-10

Malaria has been widespread and severe in India Quinine and synthetic antimalarial drugs have been in short supply Medical and lay contributors to the lay and medical press have made very questionable statements regarding malaria and its treatment Claims made for specific remedies in advertisements in the lay press and medical journals have been grossly misleading These are some of the considerations that prompted the writing of this paper which is intended primarily for those who have relatively little experience of malaria

The recent high incidence of malaria in its relatively severe clinical forms is explained in part by the movement of bodies of people from one area to another and the carriage of new strains of parasite from one part of the country to another

The author inveighs against the common idea that untreated cases of malaria in which parasites cannot be found in the blood are quite common he has not seen such a case A thick blood film properly stained and examined remains the most reliable method of detecting malaria infection A negative result usually rules out an active malaria infection Sternal puncture rarely if ever shows parasites when a good thick film fails to demonstrate them The presence of parasites does not necessarily mean that they are the cause of the patient's symptoms A case of meningococcal infection in a patient harbouring malaria parasites is described to illustrate this point Sound clinical observations will prevent many mistakes

A protest is made against delaying specific treatment of malaria until the patient has had a few febrile attacks Unnecessary delay in instituting treatment is criminal

With regard to the dosage of quinine the author's practice is to give 22½ grains a day for two days followed by 15 grains for five days in *P falciparum* infections *P vivax* infections are treated with 15 grains a day for seven days Administration should be oral if possible if not it should be intravenous The intravenous dose should not exceed 10 grains and the injection should take at least 10 minutes In most Indians 6 or 7 grains are adequate If repeated the interval between injections should usually be at least six hours The chief use of intramuscular injections of quinine is in very young children in whom oral or intravenous administration is difficult or impossible

Norman White

SARMENTO A Aspectos medico-sanitarios da regiao de Camacupa [Epidemiology of Camacupa] *Africa Médica* Lisbon 1944 June v 10 No 6 107-18 5 figs [11 refs]

Camacupa is an administrative district of the Province of Bie Angola It lies in lat 12 08 S longitude 17 33 E at an altitude of

1 476 metres and is crossed by several streams. Vegetation is of poor growth in spite of the fact that in the time of the rains parts become almost lakes. Rice is the commonest cultivation others being millet and cassava. The population totals 96 602 of which the blacks constitute 99.1 per cent and the whites and half-castes each 0.4 per cent only. The diet is monotonous and the food deficient in protein (especially animal protein) in fats (both animal and vegetal) and in vitamins.

As for diseases malaria is most common in fact Camacupa is to be regarded as an hyperendemic area. In 1940 there were 1 500 cases among them 8 of blackwater fever and in 1941 1 873 cases with 3 of blackwater fever. In the whole of the rest of the Province of Bié there were only 4 476 cases of malaria and 12 of blackwater fever that is 2.5 per cent of all the cases of malaria and 8 out of 20 cases of blackwater fever in the province in 1940 occurred in Camacupa. One hundred and ninety were seen in children under one year and 504 under five years. Death from malaria were few in successive years from 1938 to 1941 they were 7 15 3 and 16 only. Splenomegaly was examined for in 100 men 100 children and 137 women and the percentages were 19.66 and 29.9 respectively. The parasitic index was nineteen. *P. falciparum* was commonest 63.1 per cent *P. vivax* next 31.2 per cent *P. malariae* only 5.2 per cent. Other diseases frequently met with were phagedaenic ulcer especially of the legs and goitre which is often seen of a large size. Two of the latter are illustrated and the glandular enlargement in each is almost half the size of the patient's head.

H. Harold Scott

FAUST E. C. Malaria Mortality and Morbidity in the United States for the Year 1942. *J. Nat. Malaria Soc.* Tallahassee Fla. 1944 June 13 No. 2 79-83 1 fig.

The malaria mortality in the United States continues to decline. In 1942 only 841 deaths were ascribed to malaria. In that year only eight States had malaria mortality rates exceeding 1 per 100 000 these were Arkansas 6.0 South Carolina 5.3 Mississippi 3.8 Alabama 3.3 Louisiana 2.6 Florida 2.5 Georgia 2.4 and Texas 1.42. The average malaria mortality rate for the 14 southern States has declined without intermission from 11.2 in 1935 to 2.02 per 100 000 in 1942. Only four counties had rates exceeding 2.5 per 100 000 there were 29 such counties in 1941.

Malaria morbidity data are very incomplete in the United States as everywhere else. Only in the State of Mississippi does notification appear to be adequately carried out here the ratio of malaria deaths to malaria cases was 1:378. For the United States as a whole this ratio was 1:70.

Norman White

HACKETT L. W. Spleen Measurement in Malaria. *J. Nat. Malaria Soc.* Tallahassee Fla. 1944 June 13 No. 2 121-33 1 fig.

The author uses the results of the spleen and blood examination of nearly 40 000 children aged 2 to 12 carried out in winter surveys over a period of years in seven Italian and seven Albanian towns to demonstrate the importance of the spleen survey in sizing up an endemic situation. Over 90 per cent of the endemic malaria present was revealed by the spleen survey alone. The spleen survey is of the greatest value in measuring the results of control measures and in comparing the

malaria intensity of different places It is not advocated that microscopic examination of blood preparations should be neglected it should be carried out where facilities are available Spleen and blood surveys present different pictures of the same situation they should be made on the same individuals

The importance of the spleen survey makes it most desirable that a standard method of examining spleens and recording their sizes should be adopted The method advocated is not the method commonly associated with the author's name it is one that is already widely used The term spleen rate should apply to the group examined spleen index to the whole community The standard spleen rate should apply to children in the relatively non immune period of life not over 14 excluding babies For recording spleen sizes the abdominal surface to the left of the midline from the costal margin to the symphysis pubis is divided by horizontal lines into four equal spaces two above and two below the umbilicus Spleens which are palpable only on deep inspiration are number 1 spleens Larger spleens are numbered 2 or 3 if above the umbilicus 4 or 5 if below it The size of the average enlarged spleen is significant It tends to be higher the longer the transmission season One may find a very high spleen rate with an average enlarged spleen of little more than 1 this would indicate a very short intense period of infection The average spleen is of less account it takes count of the 0 or non palpable spleen The spleen rate is necessary for its interpretation The simple method of recording and averaging spleen sizes has been criticized as inexact but the estimation of the degree of splenic enlargement by abdominal palpation is a rough and ready procedure The method has stood the test of time and statisticians in many lands

Norman White

LAOUILHEAU R Indices splénique plasmodique gamétique chez les écoliers de Libreville [Spleen Parasite and Gametocyte Indices among School Children of Libreville] *Rev Sci Méd Pharm et Vét de l'Afrique Française Libre* 1943 July \ 2 No 3 209-12

In Libreville the capital of Gabon the author examined 1069 school children from 5 to 15 years of age in the month of June the beginning of the dry season Malaria parasites were found in the blood of 67 per cent The spleen index was 40 per cent Of the children examined 145 were half-caste and 924 native The parasite index of the native children was higher than that of the half-castes but their spleen index was much lower Of the infections found 39.44 per cent were *P. falciparum* 34.75 per cent *P. vivax* and 4.02 per cent *P. malariae* The remainder were mixed infections Gametocytes were found in 133 children 18.5 per cent Microfilariae were found in the blood of 51 children and a trypanosome in one No spirochaetes were found

Norman White

YAO Y T WU C C & PEI Y S Some Epidemiological Factors of Malaria in Mangshih Yunnan with Remarks on the Occurrence of Blackwater Fever *Chinese Med J* Washington 1943 July-Sept \ 61 No 3 197-211

This is a record of the results of a malaria survey made during the second half of 1940 Mangshih is a valley between Lungling and Chefang (1940)

near the south west terminus of the Yunnan Burma Highway. It is about 1120 metres above sea level. It has a population of 25,000 mostly Shan of whom 3,000 live in the town of Mang-hih. The climate is mild, the rainy season begins in April and ends in September.

The spleen rate of children under 13 years of age was 30.7 in the town and 36.1 in the villages. The corresponding parasite rates were 25.2 and 32.1. *P. falciparum* infections predominate. 80 per cent of the total. Infection rates are much higher among Chinese than among Shans. There is a marked increase of malaria cases in the last three months of the year. *A. minimus* the chief vector was most plentiful from September to November.

Sixteen species of *Anopheles* were identified. Of 18,177 adults 17,239 were *A. minimus*, 2,912 *A. jayporiensis* var. *candidiensis* and 2,494 *A. hyrcanus* var. *s. c. c. c.* Of 19,572 larvae 6,718 were *A. sinensis*, 5,879 *A. annulatus* and 4,287 *A. minimus*. The other species were in comparison infrequent. Infections were found in one of 1,695 *A. sinensis* dissected in 3 of 1,363 *A. candidiensis* and in 195 of 5,883 *A. minimus*, an infection rate of 3.3 per cent for this species. *A. minimus* shows a much greater preference for human dwellings than the other species. Itches are its favoured breeding place.

Five cases of blackwater fever are reported. The disease is not uncommon in the south west of Yunnan, elsewhere in China it is rare. [See also this Bulletin 1941 v. 38: 501-502.]

Norman White

OCBORN, R. S., RAPER, A. B. & WRIGHT, R. J. Studies in Malaria in the East African Command. II. A Reconsideration of the Diagnosis of Malaria from other Fevers in East African Natives. *East African Med. J.* 1944 Apr. v. 21 No. 4: 101-110.

The tendency to regard all fevers among East African natives as malarial until the contrary is proved is unjustifiable. In a large military hospital during 9 months there was no death from uncomplicated malaria but the case mortality rates of other common fevers were pneumonia 41, typhoid 20.3, meningococcal meningitis 1, and bacillary dysentery 0.74 per cent. Of the 155 deaths attributed to these causes pneumococcal and meningococcal infections were responsible for 170, the infections were often rapidly fatal. During the same 9 months post mortem examinations of fifty patients brought in dead or dying soon after admission excluding deaths from violence showed that 21 had died from pneumococcal infection and 12 from meningococcal infection. If early treatment should appear necessary to avert immediate danger sulphapyridine should be the drug of choice rather than quinine or mepacrine.

A clinical and laboratory study was made of 512 East African natives admitted to hospital for fever in whose blood malaria parasites were discovered. Of these 384 proved to be cases of uncomplicated malaria. In 116 cases other diseases were responsible for the fever, the finding of malaria parasites being incidental. In 12 cases active malaria coincided with some other disease. The 116 cases in which the malaria parasites were not responsible for the symptoms included relapsing fever 5, typhoid 7, amoebic dysentery 5, lobar pneumonia 42, acute respiratory disease 28, bacillary dysentery 16, miscellaneous 13.

In determining the significance of positive malaria blood slides in East African natives attention should be paid to the state of malaria immunity of the patient the clinical condition and the intensity of the malaria infection. A native who had spent his boyhood in a region where malaria is prevalent for more than six months in the year was regarded as immune. Parasites were considered to be few if an average of less than one per field was found in a thick film of average density stained by Field's rapid method and examined under a 1/12 in objective and a $\times 5$ eyepiece. This corresponds to less than 500 parasites per cmm of blood.

Among the 396 cases of active malaria in only 16 were no parasites found on the first examination. The second slide was negative in only three of these (one quartan).

Of 229 immune patients harbouring malaria parasites 37.5 per cent were not suffering from clinical malaria. The corresponding percentage of 283 non-immunes was 10.6. Of 69 immune patients with only few parasites in the peripheral blood 78 per cent were not suffering from clinical malaria the corresponding percentage of 28 non-immunes was 43.

Observations show that the administration of quinine in quantity insufficient to control the fever has a negligible effect in eliminating parasites from the peripheral blood.

The examination of thick blood films stained by Field's method may reveal toxic granulation large blue granules in the cytoplasm of the polymorphs. These changes do not occur in malaria but appear early in the course of acute bacterial infections.

Norman White

CLARK H C. The Age Level for the Peak of Acquired Immunity to Malaria as reflected by Labor Forces. *Amer J Trop Med* 1944 May 1 24 No 3 159-61

If a child has lived in an endemic malaria area a marked degree of tolerance to malaria is gained about the age of puberty but this is not very stable. The peak of relative immunity appears to be attained at an age 12 to 15 years in an inactive population but from the point of view of an efficient labour force the age groups from 15 to 30 years require almost as much attention as the younger age groups. Immunity is never absolute fatigue exposure underfeeding or the introduction of fresh strains of parasite can break any degree of tolerance. The author reproduces figures from his long-continued observations in the Chagres River villages in the Panama Canal Zone and from observations on a Negro labour force from Haiti engaged on sugar plantations in Cuba. The Chagres River villagers have been subjected to antimalarial drug control for many years. By race and life long exposure they represent people of high tolerance. The consolidated annual records of blood examinations for ten years show that there is a significant incidence of malaria at all age groups. The peak is in the age groups 5 to 20 years and there is but little difference in the percentage positive blood findings between the two groups 5 to 10 and 10 to 20. These villagers could nearly always tell whether parasites would be found in their blood or not. Similar figures for the inhabitants of the control towns on the Chagres River lake shore show that there is no evidence of a stable degree of immunity before the 20 to 30 age period. The highly tolerant Negro labour force from Haiti showed a sufficient reaction to malaria after a lifelong exposure to it to decrease its labour efficiency.

Norman White

B

SHUTE P G Relapse of Quartan Fever after 12 and 21 Years *Lancet* 1944 July 29 146

A woman now 26 was born in Calcutta and came to England when she was 5 years of age she has not left England since. From 1936 to 1943 she had repeated attacks of fever and suffered occasionally from boils. She was admitted to hospital in 1943 suffering from generalized pains and occasional night sweats. The examination of three thick blood films revealed one *P. malariae* parasite in one and three ring forms in another. A course of mepacrine 0.3 gm a day for seven days effected a cure. There was no enlargement of the spleen.

Diagnosis may not be easy in patients harbouring very few parasites. The author suggests that such cases may not be infrequent in the British Isles after this war.

Norman White

GAMNIE R P Congenital Malaria in England *Lancet* 1944 Sept 16 375-6

A woman returned to England from India in August 1939. Early in October she had an attack of fever which was repeated in 48 hours and her blood showed parasites suggestive of a benign tertian infection. This was treated with mepacrine and she remained well until three days before the onset of labour which occurred on 1st December 1939. She developed fever on 2nd December [examination of the blood is not mentioned]. The child weighed 7 lb and was breast fed for 14 days only. On 3rd January 1940 the child had fever and *Plasmodium vivax* was found in its blood. There was severe anaemia and the spleen reached to the iliac crest. Treatment with quinine was successful and on June 10th the child weighed 13 lb and there was no anaemia and the spleen was just palpable. The author saw the child now aged 4 years recently and found it very healthy and there was no history of illhealth.

The possibility of infection of the child by mosquito bites in December 1939 can be excluded and the case is regarded as one of congenital malaria. [For other record see this Bulletin 1925 v 22 399 & 806 1926 v 23 539 1929 v 26 11 1936 v 33 264 1938 v 35 252 1942 v 39 518 and 1944 v 41 354]

J F Corson

CRAWFORD T Technique of Blood Examination for Malaria Parasites *Brit Med J* 1944 Sept 9 348

There is nothing new in this article which describes the methods of preparing and staining blood films with Leishman's and Giemsa's stain.

The author points out that many laboratory workers and others not previously concerned with malaria diagnosis now find it necessary to become familiar with making and staining films and diagnosing not only the malaria parasite but also the species of parasite. There are however several points in the article with which to disagree.

It is advised that Leishman's stain should be kept for 10 days in a dark cupboard followed by a further 7 days in ordinary light before the stain is mature. [The reviewer finds that Leishman's stain is mature within 24 hours of its being prepared. That the distilled water should have a pH of 7.2 is now generally accepted. This has been stressed by WENYON, JAMES and others and was described by JAMES in *Trans Roy Soc Trop Med & Hyg* 1929 v 23 269 see also this Bulletin 1930 v 27 663]

For staining thin films Crawford uses 10-12 drops of Leishman's stain which is allowed to act for 30 seconds and then adds at least twice as much distilled water. [This is excessive and wasteful when three or at most four drops of stain diluted three times after the stain has acted for 15 seconds is sufficient. In hot climates where an alcoholic stain such as Leishman is used thin films can first be fixed and then stained using two or three drops of Leishman and diluting a few seconds later with three times the amount of distilled water.]

The author claims that the length of time required for staining varies with different batches of stain. [If by this he means different brands of stain this may be so but if it is intended to imply that the same brand varies then it is likely that inconsistent results are due to variations of the atmosphere where staining is carried out and not to the stain itself. Leishman's stain gives better results if staining is carried out in a room where there are no Bunsen burners or gas fires alight.]

It is advised that in an emergency distilled water can be boiled for ten minutes to remove the carbon dioxide. [It should have been mentioned that water should be boiled in flasks made of hard glass if soft glass is used the water becomes very alkaline owing to the soda in the glass.]

Thick films are stained with dilute Giemsa. [No mention is made of Field's stain which has largely superseded Giemsa and which gives excellent results.]

P G Skute

MANSION BARR P War Malaria and its Treatment [Correspondence]
Brit Med J 1944 Sept 9 350-51

The writer observes that in the circumstances of the present war as in the last one medical officers with little knowledge of malaria are called upon to treat the disease. He mentions some practical points of difference between benign tertian and subtertian infections and discusses their treatment. Pamiquin (plasmoquine) should not be given in the average subtertian case. Intramuscular injections of quinine are practically painless if neutral isotonic solutions as in Solvochin [quinine + phenyldimethylpyrazolone] are used. Cerebral malaria and blackwater fever do not occur in benign tertian and quartan infections but only when there has been infection with the subtertian parasite. He has found 20 grains of quinine dihydrochloride given intravenously sufficient to restore full consciousness in cerebral malaria but stresses the importance of the rate (2-4 minutes per grain) at which it should be given. It is surprising how little cerebral disturbance remains after recovery from cerebral malaria. Benign tertian malaria seldom presents alarming symptoms or causes death but the parasites persist in the body and cause relapses. [A misprint should be noted the dose of atebirin musonate injected was of course 0.3 gm not 0.3 grain as printed.]

J F Corson

KROGH Patricia P & SHAW F H The Mode of Action of Quinine Alkaloids and other Antimalarials *Australian J Exper Biol & Med Sci* 1944 June 1 22 Pt 2 139-47 11 figs [19 refs]

The experiments described in this paper were carried out with the object of obtaining information on the mechanism of the action of quinine in malaria [see also this *Bulletin* 1944 1 41 188]. For this

purpose detailed investigations have been made of the pharmacology of certain members of the cinchona group including quinine as well as of other antimalarials [For earlier related work by the authors see this *Bulletin* 1944 v 41 365] The effect of these substances on smooth and striated muscle on the circulation and on other systems was studied Quinine and certain other substances tested caused a reversal of the action of calcium on muscle which was believed to be due to the reduction of calcium ions Various examples are cited from biological studies to illustrate the similarity in effects produced by quinine or by lack of calcium ions

The authors conclude that the antagonism between quinine and calcium is of a physiological rather than of a chemical character They consider that their experiments support the hypothesis that quinine interferes with growth and reproduction of the malaria parasite by reducing the amount of calcium available in red cells This hypothesis is discussed in relation to certain known facts of malariology [The statement that malaria is a disease of the young quoted in support of their calcium theory is true only for communities of endemic areas It seems to the abstractor that the interesting hypothesis of the authors could readily be tested now that *P. knowlesi* infected red cell of monkeys can be obtained in large quantities] J D Fulton

FERNANDEZ MARINA R Atabrine Intravenously and Orally in Combination with Quinine and Plasmochin in the Treatment of Malaria Report of 268 Cases *Bol Asoc Med de Puerto Rico* 1944 May v 36 No 5 220-22

The author relates his experience in the treatment of malaria among natives and continental skilled labourers and technicians employed in military constructional work in Vieques Island Puerto Rico Vieques Island is reputed to be one of the most malarious places in the Caribbean About 65 per cent of the native population harbour malaria parasites The treatment adopted was —

First 3 days Atabrine [mepacrine or atabrin] 0.20 gm in 20 cc distilled water intravenously Atabrine 0.10 gm at noon and 6 p.m orally Quinine sulphate 0.5 gm at bed time (In heavy infections the intravenous atabrine is dissolved in 500 cc of normal saline)

4th and 5th days Atabrine 0.1 gm orally thrice daily and quinine sulphate 0.5 gm at bed time

6th 12th days Quinine sulphate 0.5 gm at bed time

Ferrous sulphate 0.3 gm after food

13th-16th days Plasmochin [plasmoquine] 0.01 gm thrice daily after food For the next 3 or 4 weeks quinine sulphate 0.5 gm daily at bed time

The 268 cases so treated included 112 continental patients and 156 natives There were 129 *P. vivax* and 139 *P. falciparum* infections There were no deaths The relapse rate was 3 per cent for the continental patients and 1.2 per cent for the natives Ten patients had cerebral symptoms The only symptoms of intolerance to the doses of atabrin used were one case of ambulatory delirium in a chronic alcoholic and two cases of urticaria among the natives Four cases of mild gastritis were ascribed to plasmoquine

No man White

HAWKING F Histological Effect of Injection of Mepacrine (Atebrin) Dihydrochloride *Brit Med J* 1944 Aug 12 209-10

In a previous investigation [this *Bulletin* 1943 v 40 p 823] the author described the histological effects produced by the injection of therapeutic doses of mepacrine methanesulphonate (atebrin musonate) intramuscularly and subcutaneously into rabbits and rats and compared them with those caused by quinine monohydrochloride. In order to find out if the effects produced by mepacrine dihydrochloride differed significantly from those of mepacrine methanesulphonate the experiments have been repeated with both salts of mepacrine and also with quinine dihydrochloride. Account has been taken of the solubility and pH value of each solution.

Microscopic lesions were caused by all three substances in the long axis of muscles. In the loose muscles of the thigh there was some swelling of the connective tissue often with haemorrhagic patches in the adjacent muscles and a resulting contracture in one case. Subcutaneous injection caused great thickening of the skin with gelatinous oedema of the subcutaneous tissues followed by necrosis and scabbing.

Microscopic examination of the fixed tissues at intervals following intramuscular injection revealed in addition coagulative necrosis and disintegrated leucocytes to be present at the site. Granulation tissue was later formed around the affected area and contained shrunken muscle fibres, giant cells and new collagen. The swollen connective tissue was infiltrated with polymorphs and mononuclear cells, haemorrhages and albuminous exudate accompanied the necrosis. The superficial layers of adjacent muscles were also affected and calcification of some muscle fibres occurred later. Subcutaneous injection caused necrosis down to the muscles of the abdominal wall accompanied by exudation and white cell infiltration.

The author concludes that the local toxicity effects of the two salts of mepacrine are indistinguishable and are identical in type with those due to quinine dihydrochloride but probably less extensive. Mepacrine dihydrochloride is suitable for intramuscular injection although less soluble than the methanesulphate since however the local damage caused by intramuscular injections of mepacrine is far from negligible this route should not be used if it is practicable to give the drug by mouth. Mepacrine should not be given subcutaneously or intravenously.

J D Fulton

SANTOS A B Profilaxia química da malária no serviço geográfico e histórico do exército. Destacamento especial do Nordeste [Chemical Prophylaxis of Malaria in the Geographical and Historical Service in the Northeast of Brazil] *Rev Med Milit* Rio de Janeiro 1943 Apr-June v 32 No 2 231-44

This is a record of the results obtained by the administration of iodo-mercurate of manganese and spleen extract Antimalarico Lorenzini as a prophylactic of malaria and in the treatment of chronic cases. The treatment was given to 94 healthy individuals and to 25 sufferers from chronic malaria. The author makes high claims for the value of this preparation, his results confirming those previously published from the north east of Brazil [this *Bulletin* 1943 v 40 824].

Norman White

ROY B C & CHATTERJEE A D Malaria A Preliminary Report on the
Studies on the Action of ANB-61 (a Preparation of Diisobutyl
Quinine) on Cases of Human Malaria J Ind a Med Ass 1944
Apr 13 No 193-6 1 chart

HOLLIS M D Modern Malaria Control J P b Health 1944
May 34 No 5 494-8

CORRÊA R R O vetores de malária no estado de São Paulo [Malaria
Vectors in the State of São Paulo Arquivos de Higiene e Saúde
São Paulo 1943 Sept 8 No 19 121-32 20 figs
on 3 pls [26 refs] English summary

The author describes the six species of anophelids that are responsible for malaria transmission in the State of São Paulo: *An. darlingi*, *An. tarsimaculatus*, *An. strodesi*, *An. albitarsis*, *An. noestensis* and *An. crucians*. *An. darlingi* has a marked preference for human blood and will on occasion attack man in daytime. Human dwellings are its favoured resting place. It is very readily infected experimentally and during epidemics infection rate of from 4 to 8 per cent have been observed. The large number of adults that have been captured in dwellings during epidemics give the impression that its density is high on assumption that is not supported by a search for larvae. It is the chief vector of malaria in the plateau region where malaria is characterized by epidemic manifestations in different places at different times phenomena which are ascribed by the author to the nomadism of *An. darlingi*.

An. tarsimaculatus is responsible for the endemic malaria of the coastal areas of the State. Though commonly found in greater numbers in stables than in human dwelling it feeds readily on man. Experimentally it is readily infected with either *P. falciparum* or *P. vivax*. It has been found naturally infected. It attains a much greater density near the coast than *An. darlingi* ever does in the plateau region. It has a multiplicity of breeding places: it can breed in small casual collections of water in hoof marks, cart ruts and the like. *An. tarsimaculatus* is a vector of malaria in forest areas especially where the trees are parasitized by bromelias which form the chief breeding places of this species.

Further investigations are necessary to determine the importance of *An. strodesi*, *An. albitarsis* and *An. noestensis* as vectors. They are certainly not so important as the two chief vectors *An. tarsimaculatus* and *An. darlingi*. The absence of these two species explains the immunity to malaria which the Valley of the Rio Paraíba do Sul enjoys. The three plates illustrate the characteristics of *An. tarsimaculatus* and *An. crucians* respectively.

CUNNINGHAM VAN SOMEREN G R Napier Grass *Pennisetum purpur-
eum* for consolidating River and Drain Banks in Anti malarial
Works East African Med J 1944 Feb 21 No 2 48-53

For the protection of the banks of drainage canal and other water courses from erosion by flood many types of grass have been used. The creeping and matted types of grass have the disadvantage that they may grow well into the water and form mosquito breeding places.

The author has made extensive trials with the reed grass *Pennisetum purpureum* Napier or elephant grass and reports favourable results. For success the banks should be well sloped and the first row of grass should be at the base of the bank. Other rows should be staggered at one foot spacing. The grass grows rapidly after a year or so it will have stems up to 6 feet in length. It is easily propagated by cutting and will grow in most types of soil in Kenya at altitudes up to 7 000 feet. If the stems are allowed to grow the shade provided may make conditions unfavourable for *A. gambiae* breeding. The grass has an economic value it provides fodder for cattle and the stems can be used for fences and hurdles.

Nornan White

MURRAY W C & KNUTSON H Airplane Dusting with Paris Green for Control of *Anopheles quadrimaculatus* Say in Water Chestnut covered Areas of the Potomac River during 1943. *Pub Health Rep* Wash 1944 May 5: 59 No 18 573-83 6 figs (4 on 2 pls & 1 map)

Water chestnut *Trapa natans* first observed in the Potomac River in 1919 spread rapidly in 1940 it partially or completely covered every bay and cove along the Potomac from Washington D C to Quantico Va. Its mat like growth hinders navigation and affords ideal breeding conditions for *A. quadrimaculatus*. Six military establishments are adjacent to water-chestnut covered river areas. During 1943 these areas were regularly treated by airplane dusting, once a week from July 4th to September 19th. The total area dusted varied from 3 764 acres during the first week to 1 140 during the last week of this period. The insecticidal dust used was Parisgreen 1 part mixed with powdered soapstone 4 parts by volume. The average application per acre was 5.4 pounds of the mixture for each treatment. The total cost was \$1.20 per acre per application.

The systematic capture of larval and adult *A. quadrimaculatus* in treated and untreated control areas showed that the dusting was highly successful. The control of *A. quadrimaculatus* effected varied from 89.8 per cent at Fort Washington to 99.7 per cent at Stump Neck with a mean of 96.9 per cent for all six military establishments.

Norris White

DE ANDRADE G C O Verde Paris na campanha contra o *Anopheles gambiae* no nordeste brasileiro [Paris Green in the Campaign against *Anopheles gambiae* in North east Brazil] *Bol. Oficina Sanitaria Panamericana* 1944 Mar 1: 23 No 3 210-23 [18 refs.]

This is a very comprehensive account of the manner in which Paris green was used as a larvicide in the eradication of *A. gambiae* from north-eastern Brazil. To it is credited the success of the campaign. In all 261 294 kilogrammes of Paris green were expended. When used dry it was applied in a concentration of one per cent. This was the method preferred. When a liquid or damp diluent was used the concentration was 0.45 per cent. The size of the Paris green particles is important. The type Airfloat with particles averaging 2 microns in diameter gave the best results. It was lethal for from 82 to 100 per cent first stage larvae. The larvicide mixture was made up near the scene of operations with material obtained locally. All collections of water

which appeared favourable for *A.ambiae* breeding, were treated. There was no case of poisoning among animal or man from water treated with Paris green.

Norman White

BLACKWATER FEVER

HEILIN Joan Reaction of Human Serum Albumin with Haematin and Haem *Nature* 1944 July 22 170 21 3 f.s. [10 ref.]

HEILMEYER *Deut Arch Klin Med* 1932 v 173 128 and FAIRLEY and BROMFIELD [*this Bulletin* 1934 v 31 176 1937 v 34 841 *Trans Roy Soc Trop Med & Hyg* 1938 v 31 374] discovered independently that haematin forms with the albumin of human or simian plasma a protein haematin compound with a characteristic spectrum differing from both methaemoglobin and parahaematin. This pigment unlike methaemoglobin does not react with H_2S , NaF , H_2O_2 or sodium azide. It was named methaemalbumin by Fairley, and the product formed from it by $Na_2S_2O_4$ reduction was called haemalbumin.

In the present work it is pointed out that haemalbumin resembles most closely caffeine haem in which caffeine is linked not to the iron but to the porphyrin alone of the haem molecules. For this reason the designation haematin albumin is preferred to methaemalbumin for the pigment formed by mixing alkaline haematin and serum albumin or plasma. In pigments of the haemoglobin class the protein is linked to both porphyrin and iron.

On passing CO through a solution of haem albumin its spectrum changes to that of CO haemochromogen in which protein is linked to iron. This is explained upon the grounds that as in CO haem the addition of CO increases the affinity of the iron atom for nitrogenous substances. Whether the protein component of the CO haemochromogen is native or denatured albumin cannot be decided since small quantities of denatured protein appear to be present in all preparations as evidenced by the first appearance of a faint haemochromogen spectrum when human plasma or serum is added to an alkaline solution of haem.

The author summarizes the types of compound which proteins may form with haem (Fe^{++}) as follows —

- 1 Haemochromogens. Usually formed by denatured protein linked to the iron.
- 2 Haem albumin consisting of native albumin linked only to the porphyrin of haem and analogous to caffeine haem.
- 3 Haemoglobins in which the protein is combined with both the porphyrin and iron of haem.

C Rimini ton

TRYPANOSOMIASIS

BOMFORD R R Trypanosomiasis in a European treated with Pentamidine [*Memoranda Brit Med J* 1944 Aug 26 2:6-7]

The patient a European aged 32 had lived in a tsetse fly infested area of Sierra Leone from April 1942 to May 1943 and apart from malaria

had remained well. In May 1943 his cervical axillary and inguinal glands became swollen and painful for a short time. In the following month he returned to the United Kingdom and then had fever occasional headaches and swelling of the face in the mornings. In the middle of September he reported sick thinking he had malaria and on examination of his blood showed scanty rings of *Plasmodium falciparum* and a few trypanosomes. A blood count showed erythrocytes 3.7 millions per cmm haemoglobin 78 per cent leucocytes 12,500 per cmm — neutrophils 70 per cent lymphocytes 21 per cent monocytes 4 per cent and eosinophiles 5 per cent. Puncture of a cervical gland showed a few trypanosomes. He had irregular fever to 100.5 F pulse rate 100–110 slight enlargement of superficial lymph glands and puffy swelling of the lower eyelids.

Treatment—Pentamidine isothionate was given intravenously as follows 100 mgm in 5 cc of water on two successive days then 150 mgm daily for eight days an interval of five days then 200 mgm followed by nine injections of 300 mgm each over a period of 14 days—making a total of 4.3 gm in 39 days. The injections caused distressing palpitation a sense of pressure in the head and itching of the skin and were therefore given very slowly. There was no fall of blood pressure and the urine remained normal throughout.

Result—Improvement was rapid and when last seen [date not given] the patient felt quite well. The erythrocyte sedimentation rate improved from 81 mm in one hour before treatment to 22 mm at the end of treatment and 5 mm three months later. The cell count and haemoglobin content became normal. The cerebrospinal fluid was examined for total protein content cell content and by the Nonne and Pandy tests for globulin. The Lange gold curve test and the Takata Ara test before treatment the protein content was 0.035 per cent and the cells 10 per cmm at the end of treatment these figures were 0.045 and 22 and 3 months later they were 0.03 and 4 respectively. The patient was allowed to return to duty without further treatment and was advised to have his CST examined in six months. [No inoculation of animals seems to have been made but the trypanosome was probably *T. gambiense*. Further reports on the cerebrospinal fluid particularly the protein content would be of great interest and value especially if there has been no risk of reinfection. See also this *Bulletin* 1942 v 39 p 32 1943 v 40 p 224 370 and 589 1944 v 41 p 466 928 929.]

J F Corson

HARDING R D Trypanosomiasis treated with Pentamidine
[Correspondence] *Brit Med J* 1944 Sept 30 447

The article by BOMFORD [above] reporting the treatment of a case of sleeping sickness by pentamidine has prompted the author to discuss the very important question of the choice of the most suitable drugs for the treatment of this disease. He has had considerable experience of Gambian sleeping sickness in Nigeria and Sierra Leone and has records of 2,000 cases of which 192 were treated with pentamidine. He considers that the infection in Bomford's patient had passed beyond the first stage. In the 192 cases referred to the dosage of pentamidine varied from 8 to 12 daily doses of 50 to 100 mgm. No appreciable difference in curative effect was noted between the higher and the lower dosages.

In early cases with a normal cell-count of the cerebrospinal fluid [presumably normal protein content also] pentamidine was about as effective as antrypol [Germanin] followed by tryparsamide but was less toxic than some of the antrypol tryparsamide combinations. In late cases however pentamidine was much inferior where the c.s.f. contained over 100 cells per cmm before treatment about 45 per cent of the patients died within a year and of the survivors about 75 per cent had definitely abnormal cerebrospinal fluid when examined more than a year after treatment. The corresponding figures for antrypol plus tryparsamide were about 13 per cent of death and 20 per cent of abnormal c.s.f. It is the general experience in Nigeria the Gold Coast and the Belgian Congo that pentamidine is of very little value once the dividing line lay around 10 to 15 cells per cmm. Serra Leone the dividing line lay around 10 to 15 cells per cmm [the author does not give figures of total protein which Siff (this Bulletin 1930 v 27 820) and Fairbairn (*ibid* 1934 v 31 559) consider more important than the cell count].

The author regards it as unjustifiable to treat any case of trypanosomiasis with pentamidine alone without first making a lumbar puncture [it is perhaps advisable to sterilize the blood before making a lumbar puncture in case the meninges are punctured and unjustifiable to treat it with pentamidine if the c.s.f. shows more than a very slight degree of abnormality]. Excellent results were obtained however in 53 cases some of which were late cases treated with a combination of a dose of 100 mmm of pentamidine and 5 doses of 2 gm of tryparsamide given concurrently. Either the two drugs were given together at 5-day intervals or tryparsamide was given at 5-day intervals and pentamidine daily the whole course lasting 5 weeks. The author thinks however that the well tried combination of antrypol and tryparsamide is the best for routine treatment of cases with any involvement of the central nervous system.

The 2000 cases referred to were re-examined more than a year after treatment and the author makes the comment that other cases hitherto reported which were treated with pentamidine have mostly not been followed up long enough—at least a year is needed to be sure that a patient is cured.

The dosage used by Bomford nearly 4 mgm per kgm is high and the author doubts whether such high doses are more effective than smaller ones in sleeping sickness.

J F Corson

VANDERPLANK, F. L. Studies of the Behaviour of the Tsetse-Flies (*Glossina pallidipes*) in the Field the Attractiveness of various Baits. *J. Animal Ecology* 1944 May 13 No 1 39-48 1 fig.

Various animals—ox, dog, domestic pig, sheep, goat, baboon, porcupine, lion, serval, cat, jackal, kudu, reedbuck, and Thomson's gazelle—were led along a path about 2 miles long cut in a thicket in which tsetse flies (*Glossina pallidipes* Aust.) were living. The object being to compare the relative attractiveness of these animals to the tsetse flies. Direct comparisons could not be made in these moving rounds because the leading animal would attract all the flies so the walks were taken twice a day. Some screens unscented and scented by bush pig were also used for comparison. Direct comparisons were

however made by tethering two animals 50 yards apart in the thicket interchanging their positions hourly. This method was better than the walks because the flies that were caught on the tethered animals had come to feed and were not merely attracted by a moving object. Other factors that might affect the accuracy of the figures were also eliminated in the stationary method. The results are shown in tables which give the numbers of tsetse flies caught on the different animals and the numbers are treated by statistical methods to indicate their significance or otherwise.

The author concluded that the animals were attractive to *Glossina pallidipes* in the following order: (1) the dog and porcupine were the most attractive; (2) domestic pig and screens; (3) sheep, goat, man and baboon; (4) serval, cat, lion and jackal. The other animals did not provide sufficient data.

The author refers to observations by SWINNEPTON [this *Bulletin* 1921 v 18 23], HARRIS [*ibid* 1931 v 28 524], LLOYD [*ibid* 1936 v 33 653], JACK (*Bull. Entom. Res.* 1941 v 31 407) and POTTS (unpublished).
J. F. Corson

WOOD S. F. An Additional California Locality for *Trypanosoma cruzi* Chagas in the Western Cone Nosed Bug *Triatoma protracta* (Uhler) [Research Notes] *J. Parasitology* 1944 June v 30 No 3 199

Fifty seven of a collection of 188 *T. protracta* were found naturally infected with *Trypanosoma cruzi* near Fallbrook, San Diego County, California.

BALCELLS L. Observaciones sobre la enfermedad de Chagas en Tacuarembó. Lesiones chagásicas de inoculación pseudocarbunclosas. Con anotaciones de R. V. TALICE [Chagas's Disease in Tacuarembó. Inoculation Lesions simulating Carbuncles] *Arch. Uruguayos de Med. Cirurg. y Especialidades* 1940 Nov v 17 No 5 481-91 [Bibliography]

SULLIVAN Thelma D. Viability of *Trypanosoma cruzi* in Citrated Blood stored at Room Temperature [Research Notes] *J. Parasitology* 1944 June v 30 No 3 200

Trypanosoma cruzi present in citrated blood from infected guinea pigs which was stored at room temperature for 257 days not only remained viable but actually multiplied. It is considered that examination of citrated blood is satisfactory for the diagnosis of Chagas's disease even when it has been stored at room temperature. The examinations included culture on Kelser's blood agar slope.
Charles Wilcocks

LEISHMANIASIS

COSTA O. G. Polipo da leishmaniose [Nasal Polypus due to Leishmaniasis] *Brasil Medico* 1944 Mar 18 & 25 v 58 Nos 12 & 13 88-9 1 fig

The patient, an adult from the State of Minas Geraes, showed evidence of old leishmanial ulceration of the legs and complained of nasal obstruction. A polypus was seen attached to the nasal septum which below the attachment had been widely perforated. The polypus presented in both nostrils; it was reddish, rounded, soft and its surface

was somewhat irregular [Nothing is said of how the diagnosis was confirmed] The author notes that the condition has been described before but that it is a rare manifestation of American leishmaniasis

Charles H. Hocks

PARROT L. Notes sur les Phlébotomes \L Sur *Phlébotomus* (*Prophlebotomus*) *mitis* Rondani et sa variété *parroti* Adler et Theodor [Concerning *P. mitis* and its variety *parroti*] *Arch Inst Pasteur d'Algérie* 1943 Mar v 21 No 1 38-50 6 figs [36 refs]

PARROT L & GOLGIS R. Notes sur les Phlébotomes \LI Sur *Phlébotomus robaudi* Neavead 1913 [Concerning *P. robaudi*] *Arch Inst Pasteur d'Algérie* 1944 Mar v 22 No 1 40-46 3 fig [13 refs]

PARROT L & MARTIN R. Notes sur les Phlébotomes \LII Sur *Phlébotomus lioisseei* *arcanae* etc [Concerning *P. lioisseei* *arcanae* etc] *Arch Inst Pasteur d'Algérie* 1944 Mar v 22 No 1 47-51 3 figs

PARROT L. Notes sur les Phlébotomes \LIII A propos de *Phlébotomus mascus* Grass [Concerning *P. mascus*] *Arch Inst Pasteur d'Algérie* 1944 Mar v 22 No 1 54-55 3 figs

PARROT L & MARTIN R. Note sur les Phlébotomes \LIV *Phlébotomus de Djibouti* [*Phlébotomus* of Djibouti] *Arch Inst Pasteur d'Algérie* 1944 Mar v 22 No 1 55-59 5 figs

PARROT L & CLASTRIER J. Note sur les Phlébotomes \LV *Présence de Phlébotomus pfeifferi* en Tunisie [*P. pfeifferi* in Tunisia] *Arch Inst Pasteur d'Algérie* 1944 Mar v 22 No 1 60-6 [18 refs]

FEVERS OF THE TYPHUS GROUP

CROFTON J & DICK J C. Clinical and Pathological Aspects of Typhus in the Middle East Forces *J. Royal Army Med Corps* 1944 July v 83 No 1 1-6

This paper deals only with the clinical features of 67 cases of typhus fever treated in a large British Military Hospital in the Middle East between March 1942 and October 1943. All but one of the patients were Europeans. In 47 of the cases Rickettsia agglutination tests carried out by C. E. VAN ROOYEN [see this Bulletin 1943 v 40 895] indicated that 28 were murine probably flea borne and 19 epidemic probably louse borne. Of the former group five were severe and one was fatal. Of the latter 15 were severe and one was fatal. In the remaining 20 cases the reaction was not carried out or it gave an indefinite response. The Weil-Felix reaction was positive in all the cases.

The mode of onset was not characteristic although nearly all the patients described it as sudden fever of them sought admission till the 3rd or 4th day.

The duration of the fever was 4-9 days in five cases, 10-15 days in 41 and 16-24 days in 21 of which 13 were epidemic in type.

Defervescence was by crisis in about half of the epidemic cases and in rather less than one-third of the murine. In all the 9 cases in which the fall by lysis began before the 9th day the disease was murine.

In 70 per cent of the cases the rash first appeared on the 4th to the 6th day it was completely absent in one very mild case. It was often observed on the palms as well as on the trunk and extremities. Some times there was a tendency to papulation. Subcuticular mottling was often absent in mild cases. Petechiae appeared in the centre of the macules in severe cases. On the whole the intensity of the rash was in proportion to the severity of the attack.

Tremors especially of the lips and tongue occurred in 30 per cent of the cases usually about the 7th day and in three fourths of the patients with pronounced tremor the attacks were severe or fatal.

Torpor was a feature of all the severe attacks its onset was usually between the 7th and 9th day. In eight severe cases there was temporary deafness beginning on the 7th or a later day.

The spleen was palpable in 30 cases usually from the 5th day and often for only one or two days. Rales or crepitations with cough were observed in 30 cases of which 20 were severe. One patient developed pneumonia and another a lung abscess.

Diarrhoea occurred in nine severe cases. There was incontinence of urine often also of faeces in 11 cases of which four were fatal.

Early in the attack the leucocyte count though higher on the average than in enteric was of little diagnostic value.

Great loss of weight often amounting to 2-3 stones was a feature of all the severe attacks.

Patients were kept flat in bed and were turned frequently on alternate sides to prevent hypostasis. An intake of fluid of five to seven pints according to the weather was enforced and great importance was attached to a generous diet with two hourly feeds of milk and egg flip supplemented by minced chicken or fish vegetable purees eggs bread and butter milk puddings fruit juices and marmite.

Sulphonamides when given for chest complications seemed to make the patients more toxic.

Reliable diagnosis was seldom possible before the appearance of the rash and even then might be difficult apart from the Weil Felix test. Blood culture for enteric organisms should be done in all cases. Murine cases were milder on the whole than epidemic but could not be differentiated from them solely on clinical grounds. Of the five fatal cases three were diagnosed as epidemic one as murine and one as of uncertain type.

High titre Weil Felix reactions were regarded as diagnostic of typhus only one exception to this rule was encountered a case of paratyphoid B [The diagnostic titre is referred to as 14 80 presumably 1-480 is intended].

The post mortem findings in four cases are described varying numbers of microscopical haemorrhages and typhus nodule were found in the brain.

[The fatality rate of about 7 per cent is stated by the authors to be low but no reference is made to the great importance of age as a factor in prognosis.]

It is to be hoped that the epidemiological aspects of the disease in the Middle East will be studied to find whether the evidence points to flea transmission in the cases in which the Rickettsia agglutination reaction is of the murine type. In war conditions every case of typhus fever will rightly be handled as one of louse borne type unless there is proof to the contrary but if in the cases in which the titre of agglutination to *R. mooseri* is higher than that to *R. prowazeki* the infection

should turn out to be incapable of transmission by lice from man to man the control measures would be directed against the rat instead of the louse

The paper should serve the purpose for which it was intended *viz* to emphasize the variability of the disease and to correct the wrong impression conveyed by some text book descriptions]

John H. D. Megaw

NEUJEAN G. Enquete sur une epidemie de typhus exanthematique (1939-1940) [An Enquiry into an Epidemic of Exanthematic Typhus Fever (1939-1940)] *Rec Traux Sci Med Con o Bel e Léopoldville* 1944 Jan No 2 7-46 28 charts

In the Ruanda Urundi region of the Belgian Congo [in the eastern part of the colony just south of the equator] Weil Felix tests in suspicious cases were uniformly negative during the years 1936-1938. In the area typhoid fever was endemic and there was widespread infestation with lice and fleas.

Early in 1939 there were two cases in which *Proteus* OXA was agglutinated at a titre of 1-160. Towards the end of the year steadily increasing numbers of sera from different localities agglutinated OX19 and an enquiry was started.

Rickettsiae were isolated from lice collected from the patient and although the organisms were completely non-orchitic they were regarded as murine because of their low virulence to guinea-pigs.

Rickettsiae were also isolated from the blood of a patient who died on the 6th day. This strain was similar to the louse strain except that two of the guinea-pigs used in passages had slight orchitic reactions.

Sixteen pooled suspensions each of which was made from the brains of 10 different groups of rats caught in the affected area were used for the intraperitoneal inoculation of 16 guinea-pigs. Six of the guinea-pigs reacted, five of them developed orchitis but from only two were Rickettsiae recovered and one of the strains was consistently orchitic.

Between 1939 and 1940 as many as 902 sera of patients gave positive Weil Felix reactions. The titres did not exceed 1-320 in 93.6 per cent of the patients. The titres with OX19 and OX2 were the same in all cases and the reaction with OXA was negative in all. In a number of patients the reactions were tested repeatedly and it was found that they became negative within 10 days or so. This observation is difficult to reconcile with the further observation that every one of 28 healthy persons with no history of illness gave positive reactions and in 22 of these the titre was 1-160 or 1-320. These tests were carried out on persons in a heavily infected area and apparently at the height of the epidemic conditions.

The percentages of positive reaction and the average titres of the agglutination increased progressively during the first two months of the period and then declined *pari passu* with the decline of the epidemic.

Typhoid fever was prevalent in the area and among 680 sera subjected to the Widal and Weil Felix tests 241 reacted to both. Of these 51 reacted in higher titres to the Widal than to the Weil Felix test and 59 reacted at the same titre to both tests. In a number of the cases in which repeated tests were made it was found that the Widal reaction usually became positive later and negative earlier than the Weil Felix. The Widal reaction was regarded as anamnestic and as significant only in the cases in which the titre was higher than that of the Weil Felix reaction.

The author concluded that he was dealing with an epidemic of murine typhus fever of low virulence with rapid and widespread diffusion over a wide area. He believed that practically the whole of the population became infected and that most of the attacks were symptomless. The flea was regarded as the vector but the louse was also thought to play a part. There was practically no mortality and the author felt justified in recommending the cessation of severe measures of control which were being instituted in the area. In fact he believed that the epidemic established a valuable degree of immunity against the risk of louse-borne historic typhus. *John W D Meade*

JADIN J. Presence de typhus exanthématique murin à Coquilhatville [Murine Exanthematic Typhus Fever in Coquilhatville] *Rec Trav. Sci. Méd. Congo Belge* Leopoldville 1944 Jan No 2 47-51

It is stated that apart from the isolation of murine Rickettsiae described by NEUJEAN in the paper abstracted above there has been no evidence of the occurrence of murine typhus in the Belgian Congo. In the typhus epidemic of 1934 in Ruanda Urundi the strain isolated was described as being of the epidemic type.

In February 1940 the author isolated an orchitic strain of Rickettsiae from a pooled suspension of the brains of nine rats (*Mus rattus rattus*) captured in the port and native quarter of Coquilhatville (situated in the interior of the Belgian Congo on the equator and on the bank of the Congo River). The strain ceased to be orchitic after 6 passages through guinea-pigs.

Two other orchitic strains were isolated from rats in the same locality. One of these ceased to be orchitic after three passages; the other was passaged 60 times through guinea-pigs and was orchitic in all but three of the passages. It was also passed 15 times through white mice. Grey rats were susceptible but white rats did not react to infection.

Sera of 160 wild rats were tested. 27 of these agglutinated *Pr. OX19* at a titre of 1-100.

No cases of typhus fever were detected in the area and no positive Weil-Felix reactions occurred in sera examined during a period of four years with the exception of those referred to in the following paper by the same author. *John W D Meade*

JADIN J. La fièvre rouge congolaise est du typhus exanthématique murin [The Red Fever of the Congo is Murine Exanthematic Typhus] *Rec Trav. Sci. Méd. Congo Belge* Leopoldville 1944 Jan No 2 52-96 24 figs [22 refs]

The name *Fièvre Rouge Congolaise* was applied by LEFROU in 1927 [this *Bulletin* 1928 v 25 529] to a peculiar kind of fever in the French Congo. The author quotes a definition of the disease or rather group of diseases as a fever characterized by a rash and polyadenitis but he adds that these features are of variable occurrence so that no clear indication is given of the criteria on which a diagnosis of the fever is based.

The disease is stated to have an almost negligible fatality rate and among the 20 cases described the rash was absent in 9 and polyadenitis

in 10. It is also stated that some of these cases were not diagnosed as red fever and others were regarded as of a doubtful nature.

[From the clinical details and the fever curves it may be stated that the features of cases are compatible with a diagnosis of flea borne typhus with a wide range of duration and severity.]

The cases occurred in the Province and town of Coquilhatville which are infested by rats. The Weil Felix test was performed in 14 cases in five the reaction was negative in five *Pr OXA* alone was agglutinated at titres ranging from 1-50 to 1-200 in two there was a low titre response with *OXI9* and *OXA* in the remaining two *OXI9*, *OXA* and *O12* were agglutinated in one of these the *OXA* titre rose to 1-1 000 and in the other which was a relatively severe experimental case the *OXI9* titre rose to 1 2 000. Apart from the last mentioned two cases the titre with any of the *Proteus* organisms did not exceed 1-250.

Extensive laboratory investigations were carried out some of the chief findings and conclusions were as follows. From all the patient orchitic strains of rickettsiae were isolated by guinea pig inoculation. The organisms were highly pathogenic to mice and white rats and small monkeys were susceptible. Infected material introduced *per rectum* into lice caused death in 3-4 days. Lice that had fed on one patient died within seven days and suspensions made from the guts of these insects caused death in other lice by intrarectal inoculation in 3-5 days.

Seven lice infected *per rectum* by material derived from the fourth intrarectal passage through lice were allowed to feed on a volunteer aged 34 years. After 14 days incubation the volunteer developed a typical attack of typhus fever lasting about 15 days. The *OXI9* titre of this patient's serum rose from zero to 1-2 000 and the *OXA* titre to 1-100. Rickettsiae were isolated from the blood by guinea pig inoculation and by intrarectal inoculation of lice. Fifteen lice were fed directly on the patient twice daily for three days all died within five days and intestinal smears from them were rich in rickettsiae.

No mention is made of attempts to transmit infection by lice that had been directly infected by biting patients or infected animals or of any investigation into the infection in rat fleas.)

Reference is made to agglutination tests carried out at Stanleyville and adjacent area of the Belgian Congo by Dr. Ignace VINCENS who examined 197 sera of patients. 126 of these reacted with *OXI9* (56 at titres of 1-800 to 1-12 800) 107 reacted with *OXA* (30 at 1-800 to 1-12 000) and 40 with *O12* (five at titres of 1-800 to 1-3 200).

An epidemic of typhus fever in Equatorial Africa is mentioned in which other workers found that *OXI* and *O12* were agglutinated equally with *OXI9*.

The author concludes that there is a special type of murine typhus in the Congo Basin and that the red fever falls into this category. He states that the transmitting vector is the rat flea though as we have shown the louse may intervene as a vector of infection from man to man.

Cross immunity between the disease and murine typhus has been demonstrated both by the author and by Dr. ORDMAN of the Medical Research Institute at Johannesburg.

The strain has been passaged 60 times through guinea pigs without change in its orchitic properties but after 15 passages through guinea pigs it lost its virulence for mice.

[Thus and the two preceding papers are of considerable interest they supply additional evidence to show that the typhus fever transmitted by fleas from rats is of frequent occurrence in tropical Africa also that neither the orchitic properties of the rickettsiae nor the Weil Felix reactions can always be relied on to differentiate flea borne from louse borne or even from tick borne typhus. The wide range of variation in the agglutination responses is particularly striking.]

John W D Megaw

TOKAREVICH K N & EPSTEIN E I [Observations on Typhus in Inoculated Patients] *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii* Moscow 1943 No 12 18-21 5 charts [In Russian]

In Leningrad in 1942 there were several cases of typhus among the medical personnel who had been previously inoculated by Weigl's vaccine and the authors compared the course of the disease in inoculated and uninoculated patients. They had details of 17 cases among them who had been partially or fully inoculated and who were brought into very close contact with typhus patients owing to lack of space fuel and shortage of staff all recovered. The course of the disease was much less severe than usual especially among the fully inoculated. Headache of varied intensity was the only cerebral symptom none became unconscious. The temperature became normal on the 9th or 10th day and in one case on the 7th. The prodromal symptoms in inoculated cases were more accentuated but developed slower than usual. The rash appeared as usual on the 4th or 5th day but was more of the roseolar type and rather scanty. In spite of the fact that practically all patients were inoculated more than a year before their illness the whole course of the disease was lighter and the symptoms were less pronounced than usual. Nevertheless a subcutaneous inoculation of a preparation of the intestines of infected mice (15-30-45 intestines) does not give a full guarantee of immunity against typhus. Typhus may occur even one month after the completion of the course of inoculations. The statement of STERNBERG in his book (1920) that typhus patients who were admitted to hospitals in an undernourished condition did not develop a more serious course of the disease than those who were physically fit has been proved to be correct.

H W Swan

TOKAREVICH K N [Epidemiological Data on Typhus in Children] *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii* Moscow 1943 No 12 22-5 [In Russian]

There were two epidemics of typhus in Leningrad—in 1932 and 1933. Between 1933 and 1941 there were only sporadic cases. This paper deals with the epidemic in the autumn and winter of 1941-42. Leningrad was besieged and blockaded during this time. Owing to the heavy raids and practically continuous bombardment of the city there was a considerable migration of the whole population from one district of the town to the other. During the peak of the epidemic—in January 1942—a great number of children were admitted to children's homes and crèches where the sanitary conditions were

appalling. That was one of the reasons why there were more cases of typhus amongst children. The following table gives the percentages of the total number of notified cases in Leningrad.

Year	Age in years			
	0-4	5-9	10-14	0-14
	Per cent	Per cent	Per cent	Per cent
1933	1	4.8	6.9	12.7
1938	0.1	0.7	1.5	2.3
1941	2	5	13	0

This table of the incidence among children shows that school children were more frequently affected than younger ones. Fifty per cent of all cases occurred amongst children under 14 years of age.

These data show that children have no special resistance to typhus but there is a general unanimity of opinion that the disease takes a much less severe course in children than in adults. *H. W. Swann*

RUIZ CASTAÑEDA M. The Problems of the Protection of Man against Typhus. *Bol. Oficina Sanitaria Panamericana* 1944 May v 23 No 5 411-18 [21 refs.]

The author thinks it reasonable to expect that epidemics of louse borne typhus may appear whenever conditions favour the transmission of the murine type of *Rickettsia* by lice.

He quotes three epidemics and two outbreaks in Mexico in which orchitic strains were isolated and in which the disease was more or less certainly transmitted by lice. On the other hand he states that cross immunity between classical and murine *Rickettsiae* is incomplete or even negative in experimental animals so that the conception arose of two distinct types of the organism differing from each other in their epidemiological features.

In 1930 the author isolated certain strains of the classical type which after a number of transfers acquired the characters of the murine strain. NICOLLE suggested that these were intermedial strains and that their occurrence indicated a stage in the transformation of the murine to the classical strain.

MOOSER and his colleagues in 1934 [this *Bulletin* 1934 v 31 621] transformed a classical strain to a murine one by laboratory procedures and in 1937 the author and SILVA [this *Bulletin* 1940 v 37 259] during an epidemic in Mexico isolated not only distinct murine and classical strains but also classical strains which became murine like after transfers through guinea-pigs. All three strains were recovered from cases in the same hospital and it was believed that they had a common origin from a single strain from which they developed by a process of evolution in which the murine and classical strains became very different from the original strain.

The differences are not regarded as fundamental but rather as quantitative as shown by the fact that murine vaccine in large doses protects against classical typhus though classical vaccine does not protect against murine typhus.

In Mexico a combined vaccine is recommended which is prepared by the method introduced by the author in 1938 from the lungs of

intranasally infected animals the rat is used for the murine element and the mouse for the classical Coxs method has been found unsuitable in Mexico its yield of antigen is relatively small

Large doses of the combined lung vaccine injected five or six times at weekly intervals have given very satisfactory results in protecting laboratory workers engaged in the preparation of lung vaccines the reactions are sharp but not so severe as those caused by typhoid vaccine

The author justifiably objects to the practice of calling the two main strains of organism epidemic and endemic

John W D Megaw

URRA I A Fleckfieber in Spanien [Typhus Fever in Spain] *Deut med Woch* 1944 Feb 4 v 70 No 5/6 60-62 1 fig

This report deals chiefly with certain haematological and serological findings in 1 322 cases of typhus fever under the charge of the author in a temporary hospital in Seville

There was pronounced leucocytosis in 69 per cent of the cases the usual count was 10 000-20 000 but in one case it was 32 000 In 11 per cent there was leucopenia A definite increase was observed in the myelocytes especially in severe attacks and a deviation to the left in the differential count The lymphocytes were diminished and eosinophiles were completely absent

Bone marrow smears obtained by sternal puncture yielded important information the most striking feature was an increase in the myeloblasts promyelocytes and myelocytes there was also a diminution in the red cells and normoblasts

The Weil Felix reaction was positive in nearly 100 per cent of the cases though sometimes not till the 21st to the 27th day in the convalescent stage With an American strain of *Proteus* O\2 there was a negative reaction in 38.4 per cent of the cases that reacted with O\19 Positive reactions with O\K were very rare and when they did occur the titre did not exceed 1-10

Praise is given to a rapid bedside agglutination test in which a drop of suspension of *Proteus* O\19 stained with Victoria blue is mixed with a drop of finger blood on a slide Details are given of the technique adopted by the author's colleagues but this differs in no essential respect from the test as employed by CASTAÑEDA *et al* [this *Bulletin* 1941 v 38 448] and modified by BRUMPT

A treatment for which dramatic results have been claimed by DANIELOPOLU was tried and found effective This consisted in intravenous injections of 250-500 cc of a solution containing 0.5 gramme of chlorine and 6.5 grammes sodium chloride in 1 000 cc water The injections were given once or twice daily in very severe cases in persons over 40 and a reduction of the fatality rate from nearly 20 per cent to under 9 per cent was obtained The results were not so startling as those claimed by Danielopolu [this *Bulletin* 1921 v 18 305] in the first world war but the author was strongly impressed by them No unfavourable reactions were observed and although the duration of the fever was not affected there was a striking improvement in the neurological manifestations [In the review of Danielopolu's book the strength of chlorine solution is given as 0.50 cgm per 1 000 cc A reference to the original leaves no doubt that the strength was

0.5 gm per 1000 cc. The confusion arose from the common Continental habit of writing 0.50 cgm meaning 50 cgm or 0.5 gm.]

John H. D. McGraw

SAUTER H. B. Ueber die Nachprüfung und Auswertung einer Schnell Agglutination bei Fleckfieber [Confirmatory Trials of a Rapid Agglutination Test in Typhus Fever] *Deut med Hoch* 1944 Feb 4 v 70 N 5/6 63-4 7 figs

BOHNEKAMP Bemerkungen zu der vorstehenden Arbeit von Oberarzt Dr. H. Sauter [Comments on the Following Work.] *Ibid* 64

The rapid agglutination reaction mentioned in the preceding abstract was tested by the author whose article is illustrated by seven clearly reproduced photographs showing the various types of flocculation that occurred.

It was found that readings of the reaction could be made within one minute when 30 hour broth cultures of *Proteus OXI* were used for seeding the agar plates from which suspensions were prepared as contrasted with a period of three to four minutes needed when 18 hour cultures were employed.

Flocculation was found to be less satisfactory when sodium citrate was mixed with the blood under test.

With blood whose Weil Felix titre was less than 1-600 the size of the floccules varied in proportion to the titre but when the titre was higher no further change was observed.

Among the 10 cases tested the earliest positive reaction occurred on the 5th day and in this case the standard test still gave a negative reaction.

In one person who had been attacked a year previously the reaction was definitely positive although the Weil Felix titre was only 1-10.

John H. D. McGraw

BECK M. Dorothy, BODILA H. L. & O'DONNELL Rosemary. A Strain of Typhus Rickettsiae Isolated from the Brain of a Wild Rat in California. *Pub Health Rep Wash* 1944 June v 59 No 22 61-12 4 figs (24 refs)

For the first time in California a strain of typhus rickettsiae has been recovered from the brain of a wild rat *R. rattus alexandrinus*.

The rat was trapped on a poultry farm in San Bernardino County in March 1943 in a room immediately over a rest room which had been used by a woman who had recently been attacked by typhus fever. The Weil Felix titre in her case rose to 1-5120.

The investigation was very thorough and the present report will be found of great interest to all who are engaged in research on rickettsiae.

Two guinea pigs inoculated intraperitoneally with the brain substance of the rat developed fever on the 8th and 11th days and each animal had scrotal swelling one or two days after the onset. The strain isolated from one of the guinea pigs was maintained through 25 serial passages through a total of 69 guinea pigs two of which died of intercurrent infection two and four days after inoculation. All the other animals showed a typical rise in temperature and 64 of them developed scrotal involvement only two died.

When scrotal material was used for inoculation the incubation period was about three days with blood it was about seven days and with brain substance about eight days

Two other rats and 21 mice trapped in the same building were negative so also were three pools of fleas including one from the infected rat

White rats inoculated with the strain in the same way as guineapigs developed inapparent infections so also did eight young cotton rats and from the brains of two of these the strain was recovered 24 days after inoculation

The strain was passed repeatedly through white mice by intraperitoneal injections of brain substance and caused typical reactions It was cultivated by the yolk sac method

Infection with the strain caused complete immunity in guineapigs against standard epidemic and endemic strains of *Rickettsiae*

Intracellular rickettsiae were found in smears made from the tunica vaginalis of infected guineapig and inoculated rabbits showed a rising titre agglutination with *Proteus O\19*

John W D Megaw

SMORODINTZEFF A A & FRADKINA R V Slide Agglutination Test for Rapid Diagnosis of Pre-Eruptive Typhus Fever *Proc Soc Exper Biol & Med* 1944 June \ 56 No 2 93-4

The practical application of this test is based on the observation of DROBYSHEVSKAYA and SMORODINTZEFF (*J Epid & Microbiol* Moscow 1942 No 1) that a specific antigen occurs in the serum of patients during the first few febrile days of typhus fever About 60 per cent of 107 typhus patients studied during the pre-eruptive stage had enough antigen to be detected by the complement fixation test and the antigen was absent from sera of 57 patients with typhoid dysentery and pneumonia The specific antigen could no longer be detected after the sixth to the ninth day when antibodies appeared

The technique described in the paper was devised as a simple method of demonstrating the presence of the antigen in the early stages of attacks of typhus fever The results obtained by this simple and rapid slide test were found to be comparable with those of the complement fixation test

Chemically pure carmine is finely ground in a mortar and is made into a 2 per cent suspension by the gradual addition of distilled water while the carmine is being constantly triturated After shaking the mixture for 10 minutes in a vessel with glass beads the larger particles are removed by a short period of slow centrifugation The suspension is then kept for 24 hours then centrifuged to precipitate most of the carmine particles After decanting the supernatant fluid the sediment is resuspended in the original volume of 0.25 per cent solution of NaCl

Serum to be tested (finger blood lysed in distilled water can also be used) is diluted 1 to 5 with distilled water and one-quarter volume of the carmine suspension is added The mixture is shaken for 5 to 10 minutes then lightly centrifuged (500 r.p.m. for 5 minutes) most of the supernatant fluid is decanted and the sediment is resuspended in the residual fluid Such antigen laden particles of carmine are specifically agglutinated by the human serum rich in antibody but the intensity of the reaction is increased several fold if the antibody is used not as such but also adsorbed on particles of carmine In the actual

test two drops of the suspension of carmine laden with serum collected during the acute phase of the disease (antigen) are placed separately on a glass slide. To one of them is added a drop of a suspension of carmine particles laden with antibody-containing serum to the other as control is added a suspension of particles to which negative serum was adsorbed. Agglutination becomes visible macroscopically within a few minutes.

Solutions with low concentration of electrolytes must be used even so certain lots of carmine are unusable because of non specific agglutination.

Sera should be used within five days

John H. D. McArthur

VORONINA E. V. & MARKOVICH A. V. [Castañeda's X factor in the Diagnosis of Typhus] (Preliminary Communication) *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii* Moscow 1943 No 12 25-7 [12 refs] [In Russian]

The aim of the work described in this article was to isolate the X factor from the culture of *Proteus X19* in order to use it as a diagnostic factor in typhus by the precipitation of this polysaccharide with the serum of a typhus patient. This precipitation reaction would be simpler and more accessible than the Weil-Felix reaction as it could be performed under primitive conditions. The method of CASTAÑEDA which consists of a dissolution of an agar culture of *Proteus X19* by antiformin with subsequent sedimentation with alcohol revealed an alkali stable X fraction [see *Bulletin of Hygiene* 1944 v 9 7/6]. With this fraction a ring precipitation test was done with different sera. The results were as follows—

Serum	Kind of animal	Title of agglutination of <i>Proteus X19</i>	Result of precipitation reaction with X factor of Castañeda
H2426 typhus	Man	1:800	++++
H59	Man	1:800	++++
H57	Man	1:800	++++
H53	Man	1:800	++++
Convalescent from measles	Man		0
Rabbit immunized by <i>Proteus X19</i>	Rabbit	1:5120	++++
Antipneumococcal	Rabbit		0
Antimeningococcal	Rabbit horse		0

This table shows that a positive precipitation reaction can be obtained only with sera of typhus patients and with the serum of a rabbit immunized with a culture of *Proteus X19*. More work on this subject is needed. If this reaction justifies itself it may replace the Weil-Felix reaction as a much simpler method.

H. H. Swann

PALATUCCI O. A. & MARANGONI B. A. Rocky Mountain Spotted Fever *Bull. U.S. Army Med. Dept.* 1944 Aug. No 79 116-20 2 figs

Three cases of Rocky Mountain spotted fever are described—two of these were proved and one was inconclusive. They occurred in

Alabama in 1943 and in the two cases regarded as proved the complement fixation test gave great help in diagnosis. In both of them this reaction was strongly positive the Weil Felix reaction with *Proteus* O19 was also strongly positive with OX2 it was negative in one case and weakly positive in the other. There was no history of tick bite in either case.

In the inconclusive case there was a history of tick bite O19 was agglutinated at a titre of 1-320 and O12 at 1-160 the complement fixation reaction was positive 1-16 with Rocky Mountain spotted fever antigen and 1-4 with murine antigen.

The total leucocyte count in one of the proved cases was 3 600 on the eighth day.

John H. D. Megaw

PLÖTZ H. WERTMAN K. & REACAN R. L. Laboratory Aids in
Diagnosis of Rocky Mountain Spotted Fever *Bull. U. S. Army
Med. Dept.* 1944 Aug No 79 40-44

The authors point out that difficulties in differential diagnosis are likely to occur in places where two or more of the fevers of the typhus group occur for example in North Africa where epidemic and murine typhus and *fièvre boutonneuse*—a disease of the Rocky Mountain spotted fever group—may exist in the same region.

Type	Day of disease	Complement Fixation Titre			Weil Felix Titre†	
		R M spotted fever	Epi- demic	Murine	Pr O19	Pr OX2
Murine	8	0	0	0	40	0
	31	0	0	320	640	0
Murine	4	0	0	0	0	0
	19	0	0	40	640	80
	36	0	0	320	320	40
Murine	12	0	0	0	1 280	80
	23	0	0	160	5 120	0
Epidemic	8	0	0	0	0	0
	12	0	40	0	640	40
R.M. spotted fever	7	0	0	0	40	80
	11	160	0	0	80	1 280
R.M. spotted fever	5	0	0	0	0	0
	12	80	0	0	640	0
R.M. spotted fever	7	0	0	0	160	0
	14	160	0	0	640	0
R.M. spotted fever	13	0	0	0	0	0
	24	160	0	0	320	0
R.M. spotted fever (fatal)	13	0	0	0	0	0
	16	40	0	0	0	0

Initial serum dilution

† Final serum dilution

KOPROWSKI H & LENNETTE E H Propagation of Yellow Fever Virus in Tissue Cultures containing Sulfonamides *Amer J Hyg* 1944 July 40 No 1 1-13 1 fig [19 ref]

The authors have failed to inhibit the propagation of the 17DD H₁ h substrain of yellow fever virus in tissue cultures of minced chick embryo and serum tyrode by the addition of maximal concentrations of sulphapyridine or sulphathiazole. In order to overcome any slight inhibitory effect of the minced chick tissue on the drug the tissue culture medium contained $20 \times 10^{-4}M$ concentration of the drug.

Neither multiplication of the virus nor accumulation of metabolites and tissue breakdown products inhibited the activity of the drug.

The authors suggest that the addition of the drugs provides a simple and effective means of protecting virus cultures against bacterial contamination and should prove of value in attempts at direct isolation in the field of virus from contaminated sources. *F O MacCallum*

KOPROWSKI H & LENNETTE E H Sulfonamides in Yellow Fever Virus Infections of Mice and developing Chick Embryos *Amer J Hyg* 1944 July 40 No 1 14-25 [35 refs]

In 1938 FINDLAY and MACCALLUM noted briefly that yellow fever infections in monkey and mouse have been unaffected by prontosil and allied drugs. The authors have obtained similar negative results in adult mice injected intracerebrally and baby mice injected extraneurally with the French neurotropic strain of yellow fever virus and treated with sulphapyridine or sulphathiazole in amounts approaching the maximum tolerated dose.

They also injected 5-15 mgm of sodium sulphapyridine daily for four successive days on to the chorio-allantoic membrane of chick embryos which were infected with the French neurotropic strain either shortly before or shortly after the first dose of drug. The drug was unable to prevent multiplication of the virus in eggs inoculated with as little as 10 intracerebral 50 per cent mouse lethal doses.

F O MacCallum

DENGUE AND SANDFLY FEVER

LEROY G V & LINDBERG H A The Diagnosis of Dengue *Bull U S Army Med Dept* 1944 Aug No 79 92-100 2 figs & 1 map

A description is given of the clinical features of 71 closely-observed cases of dengue among U S A soldiers aged 26-35 years. The place of occurrence is not stated.

Break bone pains occurred in only a few of the older patients. Progressive enlargement of the lymph nodes with tenderness on firm pressure was a striking feature. The posterior cervical submental and post auricular glands were most often involved.

The average duration of the fever was six days the range was three to eight days.

The majority of the patients had a rash.

The fever curve showed an abrupt rise to 102-104 F after 24 to 36 hours the temperature fell to 99-102 F and kept at the same level

for two to four days then there was a terminal rise to a higher level than the initial temperature followed by an abrupt fall to normal after one to two days. The temperature seldom fell to normal in the period before the terminal rise. The blood changes were confined to the leucocytes the average picture was as shown in the table —

Day of disease	Granulocytes (per cent)	Lymphocytes (per cent)	Total count
1st			
4th	72		
7th	58	19	6 128
8th	42	32	5 174
10th	33	47	
12th	45	54	6 200
	57	47	6 700
		43	6 700

The average of the lowest leucocyte counts for each patient was 4 630 the range of the lowest counts was 2 100–7 400

The pathognomonic blood picture is stated as being — (1) Moderate leucopenia most marked during the terminal rise of temperature (2) The presence of vacuolated monocytes throughout the fever [In another place the authors state that these cells are not truly pathognomonic] (3) The development of marked neutropenia and lymphocytosis during convalescence [Elsewhere the authors say that it is difficult to state whether an absolute lymphocytosis occurred or not so presumably they refer to a relative lymphocytosis] (4) The presence of Turk's irritation leucocytes during convalescence. They add that the marked leucopenia in convalescence is presented as a specific diagnostic feature of dengue [The authors perhaps unintentionally convey the impression that they regard the type of fever curve and the blood picture described by them as diagnostic features of universal applicability in dengue]

John W D Megaw

SABIN A B PHILIP C B & PAUL J R *Phlebotomus* (Pappataci or Sandfly) Fever A Disease of Military Importance Summary of existing knowledge and Preliminary Report of Original Investigations *J Amer Med Ass* 1944 July 1 & 8 v 125 Nos 9 & 10 603–6 693–9 9 figs [Refs in footnotes]

The authors of this paper had been members of a Commission which studied sandfly fever in North Africa in 1943. The findings are based chiefly on the investigation of more than 100 cases of the disease produced experimentally in volunteers belonging to the U S Army and Sicily was the original source of the infecting material.

The virus was present in the blood at least 24 hours before the onset and during the first 24 hours of the fever but never later than 48 hours after the onset. It was passaged in series seven times from man to man without obvious change in its properties.

About 95 per cent of the volunteers were susceptible to intracutaneous or intravenous inoculation but similar doses of infective serum failed to produce the disease in 50 to 75 per cent of the same class of subjects when the injections were administered by the subcutaneous or intramuscular routes

Each cc of infective serum obtained at the onset contained about 1 000 infecting doses—probably sometimes less. No virus could be demonstrated in the cerebrospinal fluid.

By gradocol membrane filtration tests the range of size of the virus was estimated to be as low as 25–37 millimicrons, so it was thought to be nearly as small as that of the yellow fever virus.

Young baboons and several species of monkeys (*Cercopithecus grisei viridis*, *C. aethiops centralis*, *C. [Erythrocebus] patas*, *Macaca radiata* and *M. mulatta*) and rodents (mice, hamsters, jerboas, rabbits, guinea pigs and cotton rats) gave negative responses to inoculation.

The virus was not found capable of producing specific plaques on the chorio-allantoic membranes of chick embryos, and negative result followed inoculation of the virus into any part of these embryos. So also there was no evidence of the presence of the virus in embryos after attempts to transmit infection through them by three or four passages carried out according to the technique used in work on the yellow fever virus.

Laboratory-reared *Phlebotomus papatasi* transmitted infection from patients to healthy persons, though there was one failure in the case of a person bitten by many infected sandflies in spite of the fact that he was later shown to be susceptible.

Control tests with *Culex pipiens*, *Aedes aegypti* and *Pulex irritans* gave negative results. Two persons who were later found to be susceptible were bitten by 93 and 195 *Aedes aegypti* mosquitoes which had fed one or more times on infected patients; the results were negative in both cases.

P. papatasi larvae were fed on infected human serum; these in the adult stage were not infective. So also sandflies whose parents had been proved to be infective failed to produce the disease in susceptible persons. These experiments were not extensive and thus were not regarded as invalidating the findings of WHITTINGHAM (this Bulletin 1925: 22–123) and others (NOSHKOVSKI *et al.* 1937 *Med. Parasit. & Parasitic Dis.* Moscow 6: 922) who have shown that the offspring of infected sandflies are sometimes infective.

The description of the clinical features of the disease is based on more than 100 experimental cases. In 85 per cent of the subjects the duration of the fever was two to four days; the extreme range was from a few hours to nine days. A scarlet flush of the face and neck was often seen and apart from this varying types of rash were observed in 5–10 per cent of the cases. The authors mention that FRANZ (DOERR, FRANZ and TASSIG, *Das Pappataciefieber*, Leipzig: Franz Deuticke, 1909) recorded a rash in 30 per cent of his cases.

Leucopenia (less than 5 000 white cells per cmm) occurred after the first day in 90 per cent of the cases, but greater help was obtained in diagnosis by daily observations of the total and relative counts of the mature (segmented) and immature (stainy) neutrophils. After the first day the former rapidly diminished in numbers and the latter increased to a striking degree. This was a constant phenomenon to which sufficient attention had not hitherto been given. [It has been described as a feature of dengue.]

Attempts to find a specific test failed; they included efforts to elicit a skin test and complement fixation and precipitation reactions.

Immunity was proved to exist in eight persons four to six weeks after recovery, and in 10 others after four months. Two medical men who gave histories of natural attacks four and seven years previously were

tested one had a typical and the other an abortive attack after inoculation with the virus

Attempts were made to produce immunity without causing the disease in one of the experiments 11 persons were inoculated intracutaneously with virus inactivated by ultra violet irradiation and although they gave no response they were afterwards found to have been immunized

The authors emphasize the well known fact that many cases of the disease are diagnosed and treated as malaria because proper blood examination has not been carried out

Applications of dimethyl phthalate or of a pyrethrum vanishing cream were found to give protection against sandfly bites for six to eight hours

In addition to the above and other findings by the Commission the paper contains a comprehensive review of existing knowledge of sandfly fever which has become an important war disease

John W D McEwen

COTTRELL J D STONACH R D & PEDDIE J J G A Syndrome of Generalized Lymphadenitis with Neutrophil Leucopenia *J Roy Army Med Corps* 1944 July v 83 No 1 12-16

An outbreak of a problematic type of short fever occurred in Tripolitania from May 1943 to an unspecified later date There were 40 cases of which 25 were closely observed and in several of the latter the patients were members of the medical and nursing staff of a New Zealand Military Hospital

The disease ran a short febrile course like a mild sandfly fever There was a more or less generalized enlargement and tenderness of the lymphatic glands starting within the first 48 hours and lasting 5-15 days The size of the glands ranged from a millimetre or so in diameter to 1.5 or even 2.5 cm [presumably in length] In most cases there was at least one group of larger size sometimes associated with a local septic condition such as desert sore The posterior cervical glands were the first to enlarge in most cases but any or all of the superficial gland groups might be affected sometimes only on one side

The average duration of the fever was five days the maximum was seven days The temperature seldom exceeded 102° F but occasionally reached 104° There was frontal headache retro ocular pain and mild aching of the back and limbs In one case the fever recurred for two days after an afebrile period of two days

A constant feature was stiffness of the neck and often there was redness of the pharyngeal mucous membrane One patient had an ill marked erythematous rash on the back and chest from the eighth to the tenth day

The neutrophil leucocytes usually fell progressively in number to 315-2470 per c mm and for an average of 3.8 days they were less than 45 per cent of the total count In one case the neutrophils fell to 16 per cent and the lymphocytes rose to 73 per cent but there was seldom any increase in the total number of the lymphocytes A cell somewhat resembling a Turk's irritation cell was seen

The mode of spread was quite unknown In an officers mess with a personnel of 25 there were five cases which occurred on the following days of June 11th 12th 20th 23rd 25th and 27th All but three of the 40 patients had been stationed within 15 miles of Tripoli for some time before the onset

During the course of the epidemic a few sporadic cases resembling sandfly fever were treated at the hospital and in two or three other cases the features were similar to those described above except that there was no pronounced neutropenia.

The authors suggest that the disease may be an unusual type of sandfly fever or may be due to an unknown virus of the sandfly-dengue group; they state that the features were not those of dengue. They do not absolutely exclude a disease related to infective mononucleosis in spite of the fact that the Paul Bunnell test was negative.

[Information about the types of fever curve and the prevalence of possible insect vectors is lacking, but the features described seem to justify the authors' suggestion that the disease was caused by a virus belonging to the dengue-sandfly fever group.] *John H. D. Mead*

PLAGUE

HECHT O. Consideraciones entomológicas a la epidemiología de la peste bubónica de los roedores en Venezuela. [Entomology in Rodent Plague of Venezuela.] *Rev. Sanidad y Asistencia Social* Caracas 1943, 8, No. 6, 1159-69. English summary (5 lines).

A previous communication by the author showed [this *Bulletin* 1943, 40, 605] that in a sparsely populated region of the State of Aragua in Venezuela the examination of sylvatic rodent fleas furnished 97.2 per cent of *Rhopalosyllus* fleas. Now the experiments of ESKER and HAAS [this *Bulletin* 1939, 36, 968] have demonstrated that *Xenopsylla cheopis* is the most efficient flea transmitter of epizootic plague, but that quite a number of other species can transmit plague and can become blocked fleas. Moreover the fleas of sylvatic rodents have an important peculiarity in that they can become infected with plague, survive for two to four months and then can become dangerous blocked fleas. On the strength of this argument the author contends that the small epidemic plague (19 human cases) in July-August 1943 could be, by analogy with the experimental results, be related firstly, for the human cases to *Xenopsylla brasiliensis*; secondly, to their appearance not far from a sylvatic plague region south of Tejerías; and thirdly, to the appearance of *Xenopsylla brasiliensis* among the much larger number of *Rhopalosyllus* fleas. These were the characteristic features of the flea collection in No. 1 Zone in June 1943. It is deduced also that note should be taken in field studies not merely of a flea index but of the species of flea which is prevalent or again its mixture with known plague vector fleas—in this case of *Rhopalosyllus* with *Xenopsylla brasiliensis*. *W. F. Harvey*

JAWETZ E. & MEYER R. F. Studies on Plague Immunity in Experimental Animals. I. Protective and Antitoxic Antibodies in the Serum of Actively Immunized Animals. *J. Immunology* 1944, July, 49, No. 1, 1-14. 1 chart. [28 refs.]

A distinction is always drawn by workers between protective and antitoxic immunization. Such a distinction is particularly liable to be made in the case of antiplague serum whose value is still much disputed.

The authors of this paper evidently consider that hyperimmune plague antiserum in combination with chemotherapy is the treatment of choice but its use for prophylaxis is to be discouraged. Their aim has been to obtain a satisfactory test for the measurement of serum potency. Hyperimmune plague sera were obtained from rabbits and a titre was attained which it seemed impossible to transcend by any other method. In order to get this testing serum the rabbits were immunized intravenously by three injections of living avirulent *P. pestis* on alternate days. They were then found to possess serum at its maximum in content of protective antibodies and thus already

within a week after the last antigen administration. No correlation was found to exist between the antitoxic and the antibacterial or protective power of a serum. It is certain however that a detectable level of antitoxic antibodies is attained in rabbits only if a re stimulating injection is given three to four weeks after the primary series of injections of antigen. The authors have developed a mouse test for assaying the anti infectious and antitoxic antibodies of sera of actively immunized experimental animals. The mice were injected intra abdominally with 0.5 ml of serum dilutions followed 60 minutes later by the intra abdominal administration of 0.1 ml of a 10^{-4} dilution of culture. Controls were given 0.5 ml of normal serum from the same animal species, others 0.5 ml buffered saline solution followed 60 minutes later by 0.1 ml of a 10^{-4} or 10^{-5} dilution of culture. The mice were observed for a period of 26 days. Precise details are

given of the mode of elaboration of standards. A detailed discussion of immunity factors together with abundant references to literature is presented.

H. F. Hare

JAWETZ E. & MEYER H. F. Studies on Plague Immunity in Experimental Animals. II. Some Factors of the Immunity Mechanism in Bubonic Plague. *J. Immunology*, 1944, July, 49, No 1, 15-30. 1 chart. [32 refs.]

Plague antiserum is a weak serum by comparison with other anti sera and the observations here recorded relate mainly under artificial conditions to factors of antibacterial immunity in general. Much of the importance of these factors in the natural mechanism can only be inferred. Conclusions are mostly expressed in negative phraseology but one positive feature emerges which is that immune animals appear to be able to fix the invading organisms locally. One of the main deductions in this thesis emphasizes opsonic activity in contradistinction to a solely cellular or humoral immunity. Some of the chief conclusions are — (1) The serum plasma or other body fluids of animals immune to plague infection are unable to destroy or lyse *P. pestis* organisms *in vitro* and *in vivo* in the absence of phagocytic cells. (2) Whole blood of plague immune animals can destroy a much greater number of plague bacilli than blood of normal animals. This higher specific activity is primarily inherent in the plasma not in the cells. (3) The phagocytic activity of normal serum cell mixtures does not differ greatly from that of immune mixtures. Only mixtures of immune serum with immune cells however are able to produce significant destruction of bacilli. (4) Immune animals are able to fix the bulk of injected *P. pestis* at the site of injection. The mechanism of fixation does not involve lymphatic blockage and deposition of fibrin network to a significant degree. (5) Splenectomy

does not reduce the resistance of immune animals to plague infection (6) Extracts from both virulent and avirulent plague strains contain a factor which enhances spreading and capillary permeability W F Harvey

GATES DORIS B *Xenopsylla cheopis* in Lincoln, Nebraska [Research Notes] *J Parasitol* 1944 June v 30 No 3 07

BACILLARY DYSENTERY

SCADDING J G Bacillary Dysentery [Correspondence] *Lancet* 1944 Sept 9 357

Referring to BOYD'S criticism of Scadding's paper [this *Bulletin* 1944 v 41 755] the latter reaffirms his opinion that the cases of dysentery treated by him were clinically mild giving reasons for that view. He also points out that his paper dealt with the *relative* efficacy of the three sulphonamides tested and that *no conclusion regarding the efficacy of sulphonamide treatment generally in bacillary dysentery was possible* since there was no untreated control group of cases. With regard to the cause of the reduction in the severity of bacillary dysentery in the Middle East since 1940 the author does not agree with BOYD'S view that it was due entirely to the early administration of sulphonamides but thinks that there has been a progressive decline in severity in each succeeding summer. If however the diminished severity was really due to the drugs then the severe cases seen in 1940 and 1941 would have had a favourable course if large doses of ordinary sulphanilamide had been given to the patients. The author finds this difficult to believe J F Corson

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

DIAL RIVERA R S & RASBERRY E A Amebiasis Analytical Study of the Cases admitted to a Philadelphia Hospital during the Last 5 Decades *Amer J Med Sci* 1944 June v 207 No 6 754-9

Among the 61,574 admissions during the last five decades to the medical services of the Hospital of the University of Pennsylvania 32 cases were diagnosed as amoebic dysentery 4 of which were complicated by hepatic abscess but of 4,764 deaths during this period only one was regarded as due to amoebic dysentery. At the same time out of 122,933 surgical admissions with 5,233 deaths one only was due to amoebic hepatic abscess. Thus only 0.05 per cent of all medical admissions were cases of amoebiasis though it has been shown that the carrier rate amongst students, food handlers and employees of institutions varied from 5 to 10 per cent. In seven cases only did it appear that the disease had been contracted in Philadelphia or nearby and the conclusion is reached that many cases were probably missed because not enough stools were examined as out of the 32 cases five were

diagnosed and treated during the last six months. It would appear that intensified interest in the disease has been responsible for increase in the numbers recently diagnosed. Of nine cases admitted after 1933 two acquired the infection during the Chicago World Fair and one in Poland.

It is considered that an increase of amoebiasis is to be expected in the United States after the war as the disease will be brought into the country by service men returning from the tropics. *P. Manson Bahr*

YATER W. M. Diagnosis of Liver Abscess by means of Thorotrast Hepatosplenography. *J. Amer. Med. Ass.* 1944 July 15 v. 125 No. 11 775-8 5 figs

As a result of service abroad in the armed forces by considerable numbers of the population the author expects a great increase in amoebiasis in the United States.

Coincident with this increase liver abscess is likely to become commoner. Its clinical diagnosis is often difficult and the author reports that Thorotrast hepatosplenography may prove of great value. A 10-year follow up study of 286 personal cases examined by this method revealed no evidence of any harmful effect.

The author's procedure is slowly to inject 75 cc of Thorotrast intravenously. X-ray exposures of the upper abdomen being made some hours later. To simplify the injection the Thorotrast is diluted with several hundred cc of isotonic sodium chloride solution and given by the gravity method. If perivenous injection of Thorotrast is made unsightly hard nodules form around the vein which later become painful and require excision. These nodules do not become malignant.

The normal liver and spleen appear as homogenous shadows of about the same density as the vertebrae. Space-occupying lesions appear as clear areas in this shadow. Metastatic carcinomas appear as areas of lessened opacity with clear cut margins and often with a halo of condensed liver tissue. The author reports five cases of probable amoebic abscess and two cases of pyogenic abscess of the liver among 20 examined. In all these cases hepatosplenography had proved of great value in diagnosis.

[Apart from the difficulty of obtaining Thorotrast in Britain hepatosplenography has not achieved great popularity here because the substance has been shown experimentally to be carcinogenic in animals. Yater's follow up of cases examined by this method should help to dispel the fear of this danger.] *Eric Samuel*

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

ORDMAN D. Public Health Aspects of an Outbreak of Tick Relapsing Fever in Non Europeans in Kimberley. *South African Med. J.* 1944 Aug 12 v. 18 No. 15 259-61 2 figs

The description of an outbreak of relapsing fever in African and Eurafian troops at Kimberley.

During the three months ending February 1944 there were 18 laboratory confirmed cases and 11 cases diagnosed clinically. A careful study of the history of these cases supports the view that the

disease was acquired locally. None of the barracks visited showed any signs of tick infestation and it seems probable that the infection must have been acquired in civilian dwellings in Kimberley and *Ornithodoros moubata* full of blood and infected with relapsing fever spirochaetes were collected at one of the Location houses visited. Local civilian cases of the disease in non Europeans undoubtedly occur and may have been overlooked in the past. The author gives details of two cases at Kimberley Hospital in both of which the blood was negative for spirochaetes by microscopical examination but spirochaetal infection was demonstrated by biological tests.

In order to control the infection in Kimberley it is recommended that new Location houses should be built of a type that will not readily harbour ticks and that existing houses should be destroyed as soon as possible preferably by means of fire. E Hindle

SAPRE S. V. Observations on the Biology of *Ornithodoros papillipes*
Birla J. Indian J. Vet. Sci. & Allied Husbandry 1943 Jun. v. 13
Pt. 2 16-20

RANDALL R. & COOPER H. H. The Golden Hamster (*Cricetus auratus*) as a Test Animal for the Diagnosis of Leptospirosis
Science 1944 Aug. 11 133-4

The authors find that young golden hamsters three to four weeks old are very susceptible to infection with *Leptospira canicola* whilst young guinea pigs and mice are comparatively resistant.

This organism was first isolated in young hamsters after the injection of centrifuged urine from an infected dog whose serum agglutinated *L. canicola* in a dilution of 1:2000. The sediment was injected intraperitoneally into four young hamsters and four young guinea pigs. Within nine to ten days the hamsters died of leptospirosis whilst the guinea pigs remained normal in appearance. On its second passage in hamsters marked icterus appeared in three to four days and the animals died five to six days after inoculation. The strain has been labelled Strain A and was used by LARSON in his paper on Leptospirosis in hamsters (see *Bulletin of Hygiene* 1944 v. 19 768).

Subsequently the owner of the dog from which this strain had been isolated became seriously ill with *canicola* fever the diagnosis being based on serological tests and finding the leptospira in the urine.

A second strain (B) of *L. canicola* was also isolated from a dog by the use of young hamsters and the owner also became infected and developed an agglutination titre for *L. canicola* of 1:1000.

In another case *L. icterohaemorrhagiae* was isolated from an infected dog by the inoculation of venous blood or the deposit from centrifuged urine into young hamsters. This is the first instance of the isolation of *L. icterohaemorrhagiae* from a dog in the U.S.A.

These results support the view that the golden hamster is the animal of choice for the isolation of *Leptospirae* especially of *L. canicola* as it produces a fatal infection in young hamsters. It can also be used for the differential diagnosis of *L. canicola* and *L. icterohaemorrhagiae* since the hamster succumb to both infections whilst in young guinea pigs only the latter produces a fatal infection. E Hindle

HEILMAN F R & HERRELL W E with the technical assistance of Constance CARTER & Nellie GREENBURG **Penicillin in the Treatment of Experimental Leptospirosis Icterohaemorrhagica (Weil's Disease)** *Proc Staff Meetings Mayo Clinic* 1944 Feb 23 v 19 No 4 89-99 2 figs [15 refs]

A record of the successful treatment of Weil's disease in guineapigs by means of penicillin

Young guineapigs weighing 200 gm were used and infected with a virulent strain of *Leptospira icterohaemorrhagiae* which caused death in from 6 to 10 days after inoculation. Both calcium and sodium penicillin were used for treatment and it was found that young guineapigs receiving from 1 000 to 5 000 units of penicillin daily in divided doses often died after several days. The susceptibility of individual animals to the toxicity of penicillin varied greatly and also varied with the dose.

Preliminary experiments were made with 14 treated guineapigs and 14 controls using 3 000 to 5 000 units of penicillin daily for the treated animals. All the 14 controls showed typical infections whilst of the 14 treated animals none showed any signs of leptospirosis. Subsequently the dose was reduced and 800 units daily of calcium penicillin adopted in a final experiment involving 64 guineapigs 32 treated and 32 controls. The treated animals received 800 units of calcium penicillin each day 200 units at 9 00 a.m. and at 3 00 p.m. and 400 at 9 00 p.m. the drug being suspended in sesame oil. None of the treated animals died of leptospirosis but three died from effects of penicillin. All the controls became infected and 29 of them died of the disease.

These results suggest that penicillin may be of use in the treatment of Weil's disease and other leptospiral infections in man. *E Hindle*

HEILMAN F R & HERRELL W E with the technical assistance of Constance CARTER & Nellie GREENBURG **Penicillin in the Treatment of Experimental Infections with *Spirillum minus* and *Streptobacillus moniliformis* (Rat Bite Fever)** *Proc Staff Meetings Mayo Clinic* 1944 May 17 v 19 No 10 257-64

The authors inoculated 50 mice with a strain of *Spirillum minus* isolated from a seven year old child suffering from rat bite fever. Ten days after inoculation 25 of these mice were treated with sodium penicillin at the rate of 1 000 units per day in divided doses treatment being continued for seven days. All these treated mice became negative for spirilla the morning after treatment began. In a control series of 25 mice all showed spirilla throughout the whole experiment which lasted 37 days except one mouse which was negative on the last day.

These results confirm previous observations as to the susceptibility of *Spirillum minus* infections to treatment with penicillin. [See this *Bulletin* 1944 v 41 293]

In three experiments a total of 86 mice were infected with *Streptobacillus moniliformis* one strain isolated from a case of rat bite fever in a 47 year old man and two strains isolated from the infected middle ear of rats infected with turning sickness. Of 43 untreated mice 42 died 33 within the first two days whilst out of 43 mice treated with penicillin in divided doses of 1 000 units per day none died. In the case of two experiments involving 35 mice treatment was continued

for seven days and none of the mice developed any signs of arthritis but in a third experiment with 8 mice treated for only $5\frac{1}{2}$ days four developed swelling of one or more joints

These studies suggest that penicillin may also be of use in the treatment of human cases of rat bite fever due to infection with *Streptobacillus moniliformis*

E Hindle

MUDROW Lilly & BOCK Marianne Der Antagonismus von Sulphonamiden und Para Aminobenzoessäure bei experimentellen Spirochäten Spirillen und Virusinfektionen [The Antagonism of Sulphonamides and *p* Aminobenzoic Acid in Experimental Infections by Spirochaetes Spirilla and Viruses] *Ztschr f Immunitätsf u Exper Therap* 1943 Dec 30 v 104 No 6 463-73

Sulphapyridine exerted only a weak therapeutic action upon a laboratory strain of *Sp duttoni* in mice a strain of *Sp usbekistanica* (used for similar experiments by FELDT [see this *Bulletin* 1942 v 39 344]) was more sensitive Sulphapyridine given on the second and third days after infection in doses of 1/150 gm per 20 gm mouse subcutaneously or 1/75 gm orally cut short the period in which spirochaetes were present in the blood Sulphathiazole was less effective If *p* aminobenzoic acid was given at the same time as the sulphapyridine the therapeutic action of the latter was almost or completely suppressed showing that *p* aminobenzoic acid is antagonistic to the antispirochaetal action of sulphapyridine [This demonstration of antagonism by *p* aminobenzoic acid is in conflict with the experience of FELDT (*loc cit*) and of the reviewer (this *Bulletin* 1944 v 41 854)]

The effect of sulphapyridine was also tested on mice infected with *Spirillum minus* If a single dose of sulphapyridine 1/200 gm per 20 gm mouse was given by mouth on the second day after inoculation the infection was completely cured the curative effect of 1/300 gm was less complete [NIRRI *et al* (this *Bulletin* 1943 v 40 57) have also shown that infections of *S minus* in the guinea pig can be cured by sulphanilamide] If *p* aminobenzoic acid was given at the same time as the sulphapyridine the curative action of the latter was abolished The infection could also be cured by a single dose of sulphadiazine 1/1 000 gm per 20 gm mouse and this curative action was similarly abolished by *p* aminobenzoic acid

In a third series of experiments mice were infected intracerebrally with the virus of lymphogranuloma inguinale most of the mice died in 5-10 days The mice were protected against this infection by sulphapyridine 1/200 gm per 20 gm mouse by mouth or by sulphadiazine 1/600 to 1/25 000 gm subcutaneously The therapeutic action was abolished by administering *p* aminobenzoic acid at the same time

Mice were also infected by intranasal instillation with the virus of mouse bronchopneumonia they died after 4-7 days with characteristic changes in the lungs Upon this infection sulphapyridine (1/200 gm subcutaneously) exerted a slight therapeutic action and sulphadiazine (1/6 000 gm subcutaneously) conferred complete protection Their therapeutic action was incompletely abolished by the simultaneous administration of *p* aminobenzoic acid

F Hawk n₅

LEPROSY

HABER H Two Cases of Leprosy in London *Lancet* 1944 May 13
629-30

Both patients were Cypriots and both had suffered from syphilis. The first a male aged 27 came to England in 1935 and while under treatment for syphilis was noticed to have small nodules on his face and subsequently on his chest. Microscopical examination revealed numerous Hansen's bacilli in a nodule and they were also found in his nasal mucus. Both ulnar nerves were thickened at the elbow. The second patient was also a Cypriot who arrived in this country in 1939 and gave a history of syphilis twelve years before. The case was one of mixed type with patches of anaesthesia and weakness of the hands. The face showed numerous reddish brown nodules in which were found acid fast bacilli they were present also in his nasal discharge. The histamine test was positive in both cases. The disease in these two patients is in an infective stage and they are living in humble circumstances in an overcrowded district. As leprosy is not notifiable they cannot legally be isolated. The author thinks that revision of the law on this point is overdue.

L Rogers

CRAWFORD W An Introduction to the Study of the Incidence of Leprosy in West China *Leprosy in India* 1944 Jan v 16
No 1 3-5

Little definite information is available regarding the incidence of leprosy in West China with the exception of the report of a short trip by Dr MAXWELL in 1935 [see this *Bulletin* 1937 v 34 362] in collaboration with whom the present writer sent maps to missionaries in these parts with the request that they would enter on them the known cases of the disease. The results are now reported for an area bounded by 102 to 105 degrees east longitude and 27 to 38 degrees north latitude. It includes many races but the evidence available shows almost equal incidence in different tribes. Altitude seems to have little effect as cases were met in both high altitudes and in low lying plains. Nor did humidity or diet appear to play any great part in this area so climatic conditions have little influence. He agrees with Maxwell that leprosy is a rural disease as most of the cases met with in towns had originated in the country so in order to eradicate the disease it must be attacked in the leper villages. The quality but not the kind of houses has some influence.

L Rogers

RAO A S Report on Leprosy Surveys in Hyderabad Deccan *Leprosy in India* 1944 Jan v 16 No 1 24-5 1 map

In 1929 and 1940 SANTRA made surveys in some villages of the Nizam of Hyderabad's territories and found leprosy rates of from 0.8 per cent to 1.6 per cent. In 1943 the present surveys were sanctioned over a period of two years and the findings in five districts are reported in this paper. House to house visits were made in villages within five miles of a leprosy hospital or clinic for cases and the contacts of any found were also examined. Propaganda was carried on at the same time to stress the importance of early treatment and the isolation of the infective cases. Tables are given of the number and

types of the cases found in each district together with the age incidence. The incidence varied between 0.11 per cent and 0.87 per cent. 75 per cent were in males but the excess is partly due to the prevalence of the purdah system limiting the number of females examined. The proportion of lepromatous cases varied between 16 per cent. and 37 per cent in different areas. It was found that the proportion of lepromatous cases was highest in the area in which the total incidence was lowest but the number examined was low in this district so this may be a coincidence. The proportion of cases in children under 15 was rather low namely from 10 per cent to 14.3 per cent. The author concludes that the leprosy problem is not a serious one in the areas surveyed but the Editor points out the proportion of lepromatous cases is fairly high in most of the districts surveyed.

L. Peters

SANTRA I. Epidemiological Leprosy Surveys in Bihar. *Leprosy in India* 1944 Jan. 16 No. 1 29-35

Bihar is a rather humid province with a high leprosy rate so the intensive survey now reported are of interest. Three areas including one mainly inhabited by Santals among a few of whom a high rate had previously been found were dealt with. The incidence in the three areas varied between 2.06 and 3.94 per cent and among the Santals in two areas it was 2.18 and 2.5 per cent respectively which does not show any excess. In persons up to 14 years of age the rates varied between 7.93 and 17.83 at 15 to 34 years of age between 36.94 and 46.03 and at above 34 years of age the percentage varied from 45.22 to 51.45. Lepromatous cases varied between 10.67 and 19 per cent and the highest proportion of lepromatous cases and of those in children was met with in the area with the highest total incidence. Males formed from 52 per cent to 55 per cent of the total. In one area an earlier survey by District Board workers had underestimated the incidence. Of cases found in the 1940 survey only 5 of 70 doubtful cases had become definite neural cases. Of 93 neural cases 2 had become lepromatous 9 had cleared up and 6 had died. Of 30 lepromatous cases seen again 2 had become tuberculoid 1 now showed no signs and 6 had died and the remaining 21 were still lepromatous.

L. Roberts

LEPPO V. I. INDIA. 1944 Jan. 16 No. 1 41-6 Annual Report of the Madras Provincial Branch of the B. E. L. R. A. 1942-43

The work in Madras remained under Dr. R. C. COCHRAN and dealt largely with leprosy in childhood of which he has made a special study at the Sindapet Clinic. During the year about 5000 more people have been surveyed with the result of confirming the former finding that contact with leprosy cases is the most important single factor leading to the acquirement of the disease. In a recent analysis of 300 children open case contact in 69.7 per cent was traced to an intrafamilial or house contact. In 167 cases there was room contact 32.3 per cent developed the more benign form. In 141 of these 167 children satisfactory histories were obtained and it was found that 70 open cases had infected them. Hence of the total of 225 children exposed by close contact 62.7 per cent (141) contracted leprosy and some of the remainder may still develop signs of the disease.

Clinical investigations showed that the earliest lesions of leprosy are macules. In prevention night segregation has been continued but its value is difficult to estimate although the fewest new cases have been found in the villages where it has been most used but their population is small.

Treatment of early lepromatous cases is shown to have been successful by the discharge of 141 cases in the year as compared with 123 in the previous year. A post graduate course was attended by 14 doctors.

L. Rogers

SANTRA I A Report on an Epidemiological Leprosy Survey in Bombay Presidency *Leprosy in India* 1944 Apr v 16 No 2 80-85

In continuation of previous intensive leprosy surveys in small selected areas in various parts of India to obtain more accurate ideas of the incidence and epidemiology of the disease the author now reports an inquiry in East Khandesh Bombay Presidency where rough surveys of eight districts by the provincial leprosy officer had shown the disease to have the high incidence of 0.5 per cent. The village of Hingona had 3,580 inhabitants 51 of whom 1.42 per cent were found to be infected. 19.7 per cent of the cases were of the more serious lepromatous type. The frequency of the disease increased with age and only 16 per cent were in children below 15 years of age all being of the neural type. An unusual feature was a higher incidence in male than in female children. In adults there was the usual higher rate in males of 60 per cent of the cases. It is of interest to note that any person suspected of having a patch of leprosy is advised to bathe in the local Tapti river on religious grounds. There is also a local custom of isolating cases of leprosy in their homes in a separate room or outside the village whatever the type of the disease and 7 out of the 51 detected cases 3 of them infectious ones had been so isolated outside their homes and 10 of the 17 previously known cases had been living in separate rooms in their own houses. It may prove practicable to isolate all the infective cases in view of this custom.

L. Rogers

SANTRA I Epidemiological Leprosy Surveys in the Central Provinces *Leprosy in India* 1944 Jan v 16 No 1 36-40

In this survey the data in two different areas are contrasted. The Kurud area is inhabited by depressed or aboriginal rice-eating Hindus in East Central Provinces. In the westernly Kashikhed the people are better to do Juar[millet] eating and Maharatti speaking with a better diet. The main data are shown in the following table —

	Kurud	Kashikhed
	Per cent	Per cent
Gross incidence	1.16	4.8
Percentage of lepromatous cases	20	8
Percentage of males	59	64
Percentage of cases in children up to 14	14	24

Among the Kurud people the proportion of lepromatous cases is higher the incidence in children lower and the total incidence lower. These data do not support the commonly held view that a high proportion of lepromatous cases indicates that leprosy is on the increase but

rather indicate that a high proportion of case in children suggests that the disease is on the increase as held by others. The author considers that the disease in the Kurud area is of old standing but not very serious whereas in the Kaskihed one leprosy is more common and probably on the increase therefore there is more need for anti leprosy work in the western Berar division than the eastern Chhattisgarh one

L. Rogers

DE SOUZA ARAUJO H. C. O combate a lepra no Brasil. Balanço de 40 anos de atividades [Forty Years of Leprosy Work in Brazil] *Brasil Medico* 1944 Apr 22 & 29 28 Nos 17, 18 158-75

MARIANO J. Lepra conjugal (estudo epidemiológico) [Marital Leprosy Epidemiological Study] *Brasil Medico* 1944 Apr 1 8 and 15 28 Nos 14-15-16 105-9

Among the many lepers in the Santa Fe Colony are 33 married couples. Seventeen of these were leprosy on admission the remaining 16 form the subject of this article. The history is given of each of these the date when the first sign was noticed in husband or wife and how long afterwards signs appeared in the other. The percentage of conjugal leprosy in relation to the total interned at the colony is 2.75 which is close to the figures recorded by others (2.5-5.0 MONTOLIVA & FLORES 1-5 ROGERS & MUIR) but there are exceptions such as Hawaiians 8.8 Filipinos 1-8. All sixteen of these couples came from rural districts all the women were engaged in domestic work of the men 13 were agricultural workers 27 of the 32 were white 5 were coloured. As regards ages between 20 and 30 years there were four men and seven women between 30 and 40 years seven men four women between 40 and 50 years three and four respectively and between 50 and 60 years two and one. The length of cohabitation ranged between three and 34 years

H. Harold Scot

WALLACE C. A. Leprosy Infection in Children *East African Med J* 1944 Mar 21 No 3 73-5

The author after previous experience of leprosy in India is in charge of a leper home in Tanganyika to which a number of children are admitted. He stresses the importance of preventing the infection of children with leprosy if the incidence of the disease is to be controlled. Children vary in their degree of immunity to the disease those in which it is strongest either remaining well or contracting the mild neural form those with no immunity developing the lepromatous type. Leprous children are delicate and any disease they develop decreases their resistance to the infection. Puberty is the most dangerous age when the infection is liable to progress and become permanent. Over treatment with hydnocarpus oil with the production of a severe reaction is dangerous but when the treatment is controlled by noting weight and temperature and maintaining nutrition it is beneficial. Any macules of doubtful nature in the child of leprosy parents should be watched very carefully and occasional small doses of hydnocarpus oil injected into the lesions

L. Rogers

TROUT C. L. The Cultivation of the Leprosy Bacillus *J. Trop. Med. & Hyg.* 1944 Feb-Mar 4 No 1 1-2.

IBARRA PEREZ R & GONZALEZ PRENDES M A Orquitis epididimitis y otros factores que disminuyen la fecundidad en los sujetos leproso [Orchitis Epididymitis and other Factors producing Sterility in Lepers] *Rev Leprológica Dermatológica y Sifilografía* Marianao Cuba 1944 July & 1 No 3 112-21 1 chart [38 refs]

LIAMONTE CUERVO J M ALONSO SUAREZ J E CASTRO PALOMINO J GRAU TRIANA J & ROMERO JORDAN O Sobre las alteraciones óseas en la lepra [Bone Changes in Leprosy] *Rev Leprologia Dermatológica y Sifilografía* Marianao Cuba 1944 July & 1 No 3 148-54 3 figs

SALAZAR C S Lepra tuberculoide [Tuberculoid Leprosy] *Rev Med Quirurg de Oriente* 1944 Mar & 5 No 1 3-

Report of a case

DHARMENDRA & SANTRA I The Use of Iodised Hydnocarpus Oil in the Treatment of Leprosy *Leprosy in India* 1944 Apr & 16 No 2 54-7

It has long been customary to add creosote as an antiseptic to hydnocarpus oil and its esters for use in the injection treatment of leprosy. Owing to the wartime difficulty in obtaining creosote a search has been made for a substitute. The addition of 1 per cent thymol to the oil has been found satisfactory and the following study of the addition of iodine has also been made in view of the long use of iodized esters in the Philippines where it was found to reduce considerably the irritation caused by injection of the esters. A modification of the method of adding iodine to the oil which was used by COLE [this *Bulletin* 1930 & 27 335] in the Philippines has been found satisfactory. A weighed amount of pure iodine is reduced to a fine powder with a glass pestle and mortar a small amount of the oil added and grinding continued and the mixture transferred to a flask with the addition of more oil. The corked flask with a thermometer through the cork is put on an oil bath and heated gradually to 120 C and more slowly to 140 C and maintained for 30 minutes at this temperature. When cool the iodized oil is filtered tested to exclude the presence of free iodine and then sterilized in ampoules in an autoclave. The mixture is not more viscous than plain hydnocarpus oil and is suitable for injection. It has been used by the subcutaneous intramuscular and intradermal methods twice a week in doses of from 2 to 5 or even 10 cc up to 10 doses with but little pain and a moderate degree of induration on intradermal injection and no pain after intramuscular or subcutaneous injection. No abscess or ulceration has followed its use and only slight hyperpigmentation after its intradermal use. A rise of temperature and other reactions have been carefully watched for but nothing beyond a slight rise of temperature and itching has been noted. The authors conclude that the iodized oil is quite suitable for injection in leprosy and the iodine appears to have some antiseptic action. *L. Rogers*

ROIG J T ACUÑA J & RODRIGUEZ DE LA CRUZ J M Las flacurciáceas Cubanas. Investigaciones acerca de la posibilidad de utilizar los aceites extraídos de las especies cubanas en el tratamiento de la lepra [The Flacurciaceae of Cuba. The Possible Use of Extracted Oils in the Treatment of Leprosy] *Rev Leprologia Dermatológica y Sifilografía* Marianao Cuba 1944 July & 1 No 3 13-12.

ALEXANDER V P Treatment of the Neural Symptoms in Leprosy
Leprosy in India 1944 Jan v 16 No 1 10-11

This brief note advocates the following treatment in neural leprosy (1) 1-2 oz of wheatgerm flour (bermax) and 1-3 oz of ground nuts taken by mouth daily (2) the injection of 1 to 2 cc of sterile 25 per cent solution of magnesium sulphate into a nerve sheath or 2 to 5 cc or more around the nerve for pains and (3) 60 grains of sodium bicarbonate dissolved in 50 cc of sterilized saline intravenously in the treatment of neuritis due to lepra reaction
 L Rogers

BOSE D V Treatment of Leprosy complicated by Syphilis *Leprosy in India* 1944 Jan v 16 No 1 6-9

This paper is based on trials in the Asansol Mining Settlement where syphilis is very common and from 16 per cent to 20 per cent of leprosy cases under treatment give positive Kahn reactions with or without any history or clinical evidence of syphilis. Owing to the poverty of the people arsenical preparations were too expensive and Avenyl (Burroughs Wellcome & Co) a mercury preparation dissolved in hydnocarpus oil gave discouraging results so the following bismuth preparations were used. Bismuth salicylate or bismuth oxy-salicylate (Howard's) were used as 3 per cent suspensions of the powder in 4 per cent creosoted hydnocarpus oil or its esters made up by mixing in a sterile pestle and mortar putting into a clean stoppered phial and sterilizing in an oil bath kept at 130 C for half an hour. This preparation was injected intramuscularly in an initial dose of $\frac{1}{2}$ cc increased weekly by $\frac{1}{2}$ cc to a maximum of 4 cc up to a maximum total course of about 4 gm. A table of twelve cases indicates that in nine of them a positive Kahn test was converted into a negative one and in the other three 3+ and 4+ reactions were reduced to 1+ or 2+. It is noteworthy that none of the twelve cases showed any clinical signs of syphilis and only four gave a history of the disease
 L Rogers

FAGET G H & ROSS Hilary Evaluation of Positive Kolmer and Kahn Tests in Leprosy *Veneral Dis Information* 1944 May v 25 No 5 133-7

This paper is an important contribution on the much disputed question of the significance of positive serological reactions in leprosy. While most leprologists agree that positive reactions occur in leprosy in the absence of syphilitic infection a few still regard such reactions as an indication of additional syphilitic infection requiring active treatment before the leprotic infection is likely to yield to treatment and they maintain that the number of positive reactions in leprosy patients is not greater than the average proportion of syphilitic infections in the general population of the country in question. The careful observations now reported from the U.S.A. National Leprosarium at Carville are summarized in Table I (below).

Both tests gave remarkably similar results and 47.3 per cent of 676 cases were positive to both tests. The percentages positive in the different types of leprosy were respectively tuberculoid 10.7 neural 17.6 lepromatous 60.6 and mixed 55.8. It is further shown that among 239 patients submitted to repeated tests in 147 the results remained practically unchanged upon each re-examination as a rule these

TABLE I
Positive Kolmer and Kahn tests among 635 leprosy patients following their admission to the National Leprosarium

Type	Kolmer test			Kahn test			Combined Kolmer and Kahn tests		
	Number examined	Positive		Number examined	Positive		Number examined	Positive in one or both tests	
		No	Per cent		No	Per cent		No	Per cent
Tuberculous	27	2	7.4	27	2	7.4	28	3	10.7
Neural	141	18	12.8	146	20	13.7	148	26	17.6
Lepromatous	200	110	55.0	196	109	55.6	203	123	60.6
Mixed	308	147	47.7	310	150	48.4	317	177	55.8
Total	676	277	41.0	679	281	41.4	696	329	47.3

patients had shown no marked changes in the activity of the disease during the period of observation. On the other hand in the remaining 92 patients who were repeatedly tested definite increases or decreases in the degree of reaction were met with in 68 of these with a tendency to become more positive. With few exceptions the increase in the serological reaction was accompanied by a definite increase in the clinical manifestations of the disease and *vice versa*. Moreover when the clinical improvement continued to the point of arrest of the disease the Kolmer and Kahn tests both reverted to negative. Thus the serological reactions during the course of leprosy are closely correlated with changes in the activity and clinical manifestations of the disease. This suggests the presence of an antibody in the serum of leprosy patients capable of reacting positively with Kolmer and Kahn antigens in the absence of syphilis. Nor did evidence of primary or secondary syphilis develop in any of the patients to account for the change in the serological reactions. In twelve cases a negative reaction gave place to a positive one coincidentally with the advance of the leprotic disease to the mixed stage. In another twelve cases in which a positive reaction became negative in ten of them the disease became arrested at about the same time. In sixteen cases with positive reactions antisyphilitic treatment failed to alter the reaction. They also found increased globulin in the blood of leprosy patients to an even greater extent than in syphilis to account for the positive reactions. They therefore do not regard positive reactions in leprosy as an indication for antisyphilitic treatment in the absence of symptoms of the latter disease. *L. Rogers*

FIELDING J. W. & COCHRANE R. G. A Plea for the Standardization of the Lepromin Test. *Med J Australia* 1944 Apr 8 \ 1 No 15 313-15 [16 ref.]

The authors summarize recent work on the lepromin test and deal fully with its standardization by means of counting the lepra bacilli in the preparations used. They support the present view that the reaction is one of bacillary protein alone and is not related to tissue cells. FIELDING (*Australian J Exper Biol & Med Sci* 1934 \ 1^o 1) found that alkalized lepromin is more effective. The present authors confirm the finding of DHARMENDRA [*this Bulletin* 1942 \ 39 85b] that lepromins obtained by grinding the bacilli produce much earlier reactions. Lepromins prepared from rat leprosy nodules contain many more bacilli than do those made from human leprosy nodules. The authors describe the Breed counting method for milk and suggest a combination of the Breed method with the Owen dust-counting method to estimate the number of lepra bacilli per cc. in lepromins in order to standardize the material. The original paper should be consulted by those interested in these methods which are rather complicated. A table is given of the counts obtained by different workers for both human and rat lepromins using different methods. They show very variable results. Hence the necessity of using standard methods such as those described in the paper. These have been carefully checked until they yielded fairly reliable results and enable more uniform and reliable reactions to be obtained by the use of this valuable preparation. *L. Rogers*

FIELDING J W The Lepromin Test in Laboratory Animals *Med J Australia* 1944 May 13 \ 1 No 20 439-41 [12 refs]

The author reports on lepromin tests in rabbits guinea pigs dogs cats and rats He used human and rat leprotic tissues which are mixed cellular bacillary suspensions and also extracts of the acid fast bacilli prepared by the method of DHARMENDRA [this *Bulletin* 1942 \ 39 855] and he confirmed the findings of that worker that bacillary extracts produce earlier reactions than do emulsions of leprotic tissues In the case of rats all the reactions were negative and in the remaining animals used the results were variable Emulsions of fresh and of alkaline fixed tissues showed only slight differences Two tables of results are given but are not easy to follow but his general conclusion is that there appears to be some evidence or resistance in different animals although this is uncertain and it is not always revealed by the lepromin test

L Rogers

MOM A M & BASOMBRIO G Estudio comparativo entre la lepro minorreacción y la intradermorreacción por el 2-4 dinitrocloro benceno en enfermos de lepra convivientes y controles sanos (Segunda comunicación) [The Lepromin and Dinitrochloro benzene Reactions compared in Lepers in those living with them and in Healthy Controls] *Rev Argentina Dermatofisiología* 1944 June \ 28 No 2 165-8 2 figs

For the lepromin reaction the authors used standard lepromin prepared according to Muir's method and the bacillary prepared by the Fernandez Olmos Castro technique the 2-4 dinitrochloro benzene was used in injections of 0.1 cc of a 1:1000 solution in acetone The result was noted in 48 hours and after three weeks and if necessary after 4, 5 and 6 weeks An erythema of 1 cm diameter was designated *one plus* of 2 cm or over *two plus* for the early reaction for the late reaction a nodule of 5-10 mm diameter was *one plus* of over 10 mm or softening and central ulceration of the nodule *two plus*

Among 147 persons thus tested the three reactions agreed in 91.8 per cent of the early reactions and 96.4 per cent of the delayed Of the different groups of cases —

1 In 61 *lepromatous* patients four reactions were doubtful the rest negative and the agreement between the lepromin and the dinitrochlorobenzene was absolute In this group were five burnt out cases in two of which the early reaction was doubtful the delayed *one plus*

2 *Tuberculoid* cases 38 in number Concordant results were given in 32 of the early reactions and 37 of the late six of the former gave lepromin positive dinitrochlorobenzene negative or doubtful

3 Nine patients not characterized both early and late reactions were in harmony in eight not agreeing in one (lepromin positive dinitrochlorobenzene doubtful)

4 Of thirteen *cohabiting* with lepers the reactions both early and late agreed in twelve disagreed in one only (early and late)

5 Twenty six *healthy controls* were tested for the early reaction and in 22 the results were in agreement of 24 observed for results of the delayed reaction 22 were in accordance discordant results (lepromin positive dinitrochlorobenzene negative) were seen in four early and two late reactions

In the discussion which followed this paper Professor BALISA remarks that apart from the intrinsic interest of the facts reported

there are two other problems calling for study in this connexion namely explanation of the mechanism of the Mitsuda (lepromin) reaction and also to what exactly is due the positive reaction in one case and the negative in another

H Harold Scott

BASOMBRIO G & MOMI A M Triple reacción cutánea por el 2-4 dinitroclorobenceno [Triple Skin Reaction to 2-4 Dinitrochlorobenzene] *Rev Argentina Dermatosisifilologia* 1944 June v 28 No 2 162-4 1 fig

During an investigation of certain skin reactions the authors observed a curious phenomenon. Two men healthy controls received intradermally in the abdomen injections one of them injections of lepromin and of a 1:1000 acetone solution of 2-4 dinitrochlorobenzene the other of the latter only. In 48 hours a reaction like the early tuberculin reaction appeared at the injection site. On the fourth day there was a localized erythema at the site of the withdrawal (some distance from the actual injection) where a drop of the dinitrochlorobenzene had come into contact with the skin. In another 24 hours these last were vesicular. A week later in various places on the abdomen and the forearms there were erythematous squamous spots of the size of a lentil to that of a copper two centavo piece becoming larger and resembling a papular syphilide and by the tenth day a nodule (like that of the delayed Mitsuda reaction) with a tuberculoid structure not clearing up until three weeks had elapsed

H Harold Scott

DHARMENDRA Intradermal Tests with Antigens prepared from the Urine of Cases of Leprosy *Leprosy in India* 1944 Apr v 16 No 2 58-61

In 1940 BERNY and MAUZÉ (this Bulletin 1941 v 38 24) described an intradermal reaction in leprosy case following the injection of an antigen prepared from the urines of bacteriologically positive cases of the disease. They claimed 100 per cent positive results in cases of all types of leprosy and negative one in all controls. The antigen was extracted from the urine free from albumin by adding three times the volume of 95 per cent alcohol. The present paper records an attempt to verify their conclusions but with negative results. The substance extracted from urines of positive leprosy case was found to be of the nature of secondary proteoses giving a positive Biuret reaction but whether extracted from the urines of leprosy or of healthy persons they produced no reactions on intradermal injection in either lepromatous or neural cases of leprosy. Similar substances were extracted from the urines of reacting lepromatous cases of the disease. The extract from one patient produced reactions in both neural and lepromatous but that from another reacting case produced positive results in only a few of the neural cases tested and in none of the lepromatous ones. The results of Berny and Mauze therefore were not confirmed.

L Rogers

BURNET E Sur les essais d'inoculation de la lèpre humaine aux rongeurs d'après quelques expériences récentes [Inoculation of Rodents with Human Leprosy] *Arch Inst Pasteur de Tunis* 1942 June 31 No 1-2 20-26 [17 refs]

This is an interesting review of recent attempts to inoculate hamsters and other rodents with human leprosy bacilli and points out the

difficulties and fallacies of such experiments. These are essentially due to human leprosy tissues not infrequently containing other acid fast bacilli than that of leprosy such as the tubercle bacillus or various saprophytic organisms. The author has previously recorded an example of the presence of the tubercle bacillus in a hamster inoculated with leprous material and similar difficulties have occurred in experiments by DE SOUZA ARAUJO [this *Bulletin* 1941 v 38 218] CHAUSSIN and [ibid p 699] DUBOIS and GAVRILOF [ibid 1942 v 39 621] and others which are quoted. It is now evident that hamsters (*Cricetus cricetus*) are not easily infected with the human leprosy bacillus. He concludes that human lepromata may contain all sorts of acid fast bacilli in addition to that of Hansen which may grow on culture media suitable for that of the tubercle bacillus or produce on inoculation into rodents nodules or abscesses containing them or even lesions disseminated in the internal organs very similar to those produced by the tubercle bacillus itself and which cannot certainly be distinguished histologically from those of human leprosy lesions. For want of exclusion of these fallacies the experimental production of human leprosy in animals has not yet been proved to take place. Even experimental infection by Hansen's bacillus is still very doubtful.

L Rogers

BURNET E & CABASSO V. Recherche d'extraits huileux des bacilles acido résistants (sur le bacille de Stefansky) [Recherches on Extracts in Oil of Stefansky's Bacillus] *Arch Inst Pasteur de Tunis* 1942 June v 31 No 1-2 27-30

The authors report experiments in which the effects of injecting oil extracts of Stefansky's rat leprosy bacillus into animals have been investigated. The bacilli were extracted over a period of seventy days in paraffin chaulmoogra and olive oils then the mixtures were filtered through Chamberland L3 bougies at 50 C and the extracts injected into the testes of guineapigs and rats which were killed and examined 60 to 64 days later. The dose of paraffin or olive oil extract was 0.75 cc for guineapigs and 0.60 cc for rats. 0.15 cc chaulmoogra oil extract was injected into a young rat. No bacilli were found in any of the lesions produced. The lesions noted were reduction in the size of the inoculated testicle and hyaline granulations on the surface of the liver and a few also on the spleen peritoneum or pericardium. They were very slightly adherent to these organs. They showed microscopically no cellular structure but only amorphous material with fatty substance of an acid fast nature in circular lacunae. To the naked eye there were small grey granulations of a pseudo membranous nature.

L Rogers

BURNET E & CABASSO V. Action des extraits huileux filtrés de bacilles acido-résistants (huile de paraffine et B de Stephansky) [Action of Oil Extracts of Stefansky's Bacillus] *Arch Inst Pasteur de Tunis* 1942 Dec v 31 No 3-4 194-6

The authors considered that the oily extracts of rat leprosy bacilli used in the experiments recorded in the above paper might not have been completely freed from the bacilli. They therefore repeated them with the following modifications. Only paraffin oil was used in quantities of four to five times the volume of Stefansky's bacilli freed as far as possible from tissue. The mixture was kept at 37 C for only

14 day and then passed through a Chamberland L2 filter candle at a temperature of 50 C [In another place the L3 candle is referred to in this connexion] Doses of 0.4 cc to 0.75 cc were injected into the testes or into the peritoneal cavities of guinea-pigs and rats as before and the animals sacrificed after 6 to 63 days. The oily solutions were stronger than in the earlier experiments and they produced similar lesions on the surface of the peritoneum the liver and spleen and occasionally on the lungs but they were more extensive in the form of loosely attached membranes. Microscopically the lesions contained a fine network of material staining acid fast as in the former experiment this was not decolourized even by the prolonged action of 33 per cent nitric acid and of 95 per cent alcohol. The effects were similar to those produced by the injection of dead bacilli in oil. No bacilli were found in the lesions.

J. Rogers

TOMÉ BONA J. M. La lepra [Leprosy] Páginas de divulgación para el médico práctico. Primera edición. Opúsculos sobre dermatosifilografía. 111 pp. 10 figs on 2 pls. 1942. Madrid. Ediciones Morata.

A general account

HELMINTHIASIS

VALDÉS DAPENA A. & PÉREZ HURTADO F. Síndrome febril con eosinofilia. Gasololosis hepática. Reporte de un caso. [Fever and Eosinophilia associated with infection with *Fasciola hepatica*] *Avance Med.* Habana. 1944. June. v. 5. No. 6. 83-4.

A case of human infestation with *Fasciola hepatica* is recorded. The patient was a white woman aged 36 a native of Cuba. She had daily fever with rigors and a temperature rising to 41 C (105 F) and pain and tenderness in the right hypochondrium. There was no nausea, vomiting or diarrhoea. No parasites were found in the faeces. The blood showed eosinophilia of 74 per cent. This led to an examination of the bile obtained by duodenal tube and it was found to contain numerous eggs of *F. hepatica*. The results of treatment will be published later. [See also this Bulletin 1944, v. 41. 677. 1943, v. 40. 753 & 472. 1942, 39. 14 & 703.]

J. F. Corson

ROURI P. & ANGLIO J. J. Un nuevo hospedero de la forma larvaria del *Multiceps serialis*. [A New Host of the Larval Form of *M. serialis*.] *Rev. Med. Trop. y Parasit.* Habana. 1944. May-June. 10. No. 3. 64. 9. 9 figs. [13 refs. English summary.]

Some characteristics of a *Coenurus serialis* larval stage of *Multiceps serialis* found in an autochthonous Cuban rodent the hutia conga (*Capromys piloride* Say) are described. This animal is reported as another host for the mentioned larval stage and this is the first time that this parasite is reported in Cuba.

DAVIS H. Ancylostomiasis associated with Hematuria. *War Medicine* Chicago. 1944. June. v. 5. No. 6. 385-8.

A young white American army recruit was admitted to hospital on 26th July 1943 because of pain in the lower part of his back with at

times sudden pain in the back of the right thigh and hip. The pain began suddenly in February 1943 lasted for about two weeks returned in April and persisted since then in varying degree. It finally led to his discharge from the Army. A provisional diagnosis of ruptured intervertebral disc could not be confirmed, but he was found to have symptomless haematuria. Remarkably thorough and complete clinical and laboratory examination were made and are given in detail in the paper. Eosinophile leucocytes in the blood always formed less than 1 per cent of the total white cells. The erythrocytes were over 4 millions per cmm in July and August decreased to 3 810 000 by September 24th and rose again to reach 54 millions on January 14th. The urine showed erythrocytes usually about 20 to 50 per high power field from the end of August to November there were a few pus cells but only a trace of albumin was found. Ova of *Necator americanus* were first seen in the faeces on October 30th.

Treatment—The patient was given courses of therapy with hexylresorcinol and tetrachloroethylene on November 6 November 18 and December 6 but hookworm ova continued to appear in the stools. On December 15 4 cc of tetrachloroethylene was given through a duodenal tube. This likewise failed to eliminate the ova. On January 5 1944 3 cc of carbon tetrachloride mixed with 15 Gm of magnesium sulfate was given. Results of all subsequent examinations of urine and stools were negative.

The author concludes that the urinary abnormalities were caused by the hookworm infestation although a nephrotic syndrome was absent.

J F Corson

ARANGO E G Anemia por ancylostomiasis [Hookworm Anaemia]

Rev. Facultad de Med. Bogota 1944 Feb v 12 No 8 389-96

When one gramme of faeces contains 10 000 hookworm eggs by Stoll's method of examination anaemia sets in and if there is no other cause for the anaemia it is of the hypochromic microcytic type and reticulocytes are present in greater numbers than in other types of anaemia. It is not moreover due to haemolysis according to the authors but to continued loss of blood from the ulcerous or other mucosal lesions of the intestine. The degree of eosinophilia present bears no direct relation to the severity of infestation. The authors mention in a list of cases one with 4 000 ova per gramme of faeces with 10 per cent eosinophiles while another with 51 000 ova had only 5 per cent. Regeneration of the blood is slow particularly in the earlier stages when the red cell count is between one and three million per cmm. The immediate cause of death in cases of severe infestation and anaemia is cardiac dilatation and the fatal issue is often heralded by a drop in the reticulocytes and in the eosinophile percentage. *vice versa* when treatment is going well the eosinophiles show an increase. When anthelmintics are administered such as oil of chenopodium or thymol the total red cell count falls but not if before and after their administration liver extract is given. It will be remembered that other workers have stressed the importance of malnutrition in the causation of anaemia in hookworm infestation see WAPIER *et al* this Bulletin 1942 v 39 100 HILL & ANDREWS *ibid* 1943 v 40 324]

H Harold Scott

NAPIER L. E. Filariasis due to *Wuchereria bancrofti*. *Medicine* 1944
May 1 23 No 2 149-79 6 figs [18 refs]

This is a general account of filariasis due to infection with *W. bancrofti* in a form which would be suitable to a text book on tropical medicine. It is not a record of new work but a systematic description in which well established facts are restated along with original observations from the author's own experience and references to the recent findings of other workers. The author is a master of his subject and the writing is clear and lucid. Nothing of importance has been omitted but the details of surgical technique in the removal of elephantoid tissue does not come within his scope. The article is apposite at the present time when so many white troops are engaged in countries in which filariasis is endemic and readers will obtain a good clinical picture with adequate description of the pathology and treatment of the various clinical conditions from this account. Charles Wilcocks

WRIGHT W. H. & MURDOCK J. R. Intradermal Reactions following the Use of *Dirofilaria immitis* Antigen in Persons Infected with *Onchocerca volvulus*. *Amer J Trop Med* 1944 May 1 24 No 3 199-202. [10 refs]

The authors required to know for the purposes of research on and control of onchocerciasis in Guatemala and Mexico the number of people who might be carriers of the infestation and yet showed no evidence of external nodules. Intradermal tests were employed and the antigen used was prepared by BOZICEVICH of the National Institute of Health by extraction of *Dirofilaria immitis* in physiological saline - it contained 0.5 per cent phenol as a preservative. Control tests were done with physiological saline and a canine serum to rule out positive reactions possibly due to sensitivity to any protein in the antigen derived from the host of *Dirofilaria*. Before the intradermal injection, scratch tests were done on all patients to avoid the possibility of intense local reactions and anaphylactic shock. These eliminated two patients. The patients had had onchocerciasis for periods varying from 1 to 20 years and were either of pure Indian or Mestizo (half breed) blood. Of the 20 tested 19 showed microfilariae in biopsies of the skin. There were no demonstrable nodules in 17 but these had had external cysts removed a few months before the tests. Three had cysts at the time of the tests. No information was available about their Wassermann or Kahn reaction. Probably some were syphilitic and nearly all had malaria. All had infestations with *Trichuris* hookworms *Strogyloides* *stercoralis* *Ascaris* or combinations of these.

All of the 20 subjects reacted positively to antigen dilution of 1:2000. Ten out of eleven reacted to dilutions of 1:4000. The negative one reacted well to 1:2000 and had been infested for 20 years and was blinded by a microfilarial invasion of the eye. Two were positive to the canine serum control (one to 1:2000 the other to 1:4000) but the reactions of both were much stronger to the *Dirofilaria* antigen.

Of 20 control patients harbouring *Trichuris* *Enterobius* hookworm *Ascaris* *Wuchereria bancrofti* *Entamoeba histolytica* or *Dientamoeba fragilis* or combinations of these 11 were positive to a 1:2000 dilution of *Dirofilaria* antigen while 7 out of 19 tested with a dilution of 1:4000 were positive. Four of these controls were tested at Huxtla

of these one had always lived in an endemic onchocerciasis zone one had visited endemic zones more than once both being positive to a 1 2 000 dilution The other two were the authors and both were negative to the *Dirofilaria* antigen although both were positive to a 1 2 000 dilution of the canine serum The 16 other controls were tested in Washington and had never been exposed to infestation with *Onchocerca* although all had intestinal helminths Of these 9 were positive to a 1 2 000 dilution and 7 to 1 4 000 Of all the controls other than the authors three were positive to the canine serum at 1 2 000 and two of these were positive to *Dirofilaria* antigen at 1 2 000 There was no correlation between the species of helminth in the controls and their reaction to the antigen The authors conclude that care is needed in the evaluation of intradermal tests Further tests with more dilute solutions of the antigen are needed to determine whether it is any use for diagnosis The evidence indicates that there would not be enough protein material derived from the dog host of *Dirofilaria* to cause false positives None of the patients had a history of allergy so that allergic states were not involved and BOZICEVICH and HUTTER (below) have shown that most allergic individuals do not react to this *Dirofilaria* antigen in dilutions above 1 4 000

G Lapage

BOZICEVICH J & HUTTER A M Intradermal and Serological Tests with *Dirofilaria immitis* Antigen in Cases of Human Filariasis
Inner J Trop Med 1944 May 24 No 3 203-8

The authors tested subjects suspected of infestation with *Wuchereria bancrofti* After reviewing the literature and describing in detail their method of making the *Dirofilaria* antigen used the authors describe the results of the injection of 0.01 cc. an amount sufficient to raise the smallest possible weal A reaction was considered positive when the diameter of the antigen weal exceeded that of the control weal by 3 mm The reactions obtained were immediate appearing within a few minutes and reaching their maximum in 15 minutes or delayed the latter occurring only occasionally and always in subjects who had shown an immediate reaction A dilution of the antigen at 1 1 000 gave false positives in about 30 per cent of individuals not exposed to *W. bancrofti* and the same concentration of the protein control antigens used (canine serum *Trichinella* antigen) also produced reactions in some individuals But at 1 2 000 the antigen was more specific and this dilution screened out most positive reactions in non infested subjects A number of allergic individuals were included in the controls in order to exclude false positives due to protein carried over from the host of the worm in individuals sensitive to such protein In these allergic subjects the 1 2 000 dilution produced a number of false positive reactions but a dilution of 1 4 000 eliminated most of these To test the influence of pyrexia on the reactions tests were done with a dilution of 1 8 000 on six patients with malaria who had not been exposed to *W. bancrofti* One of these was positive to both *Dirofilaria* antigen and to dog serum and was classed as negative one was positive to dog serum but not to *Dirofilaria* one was positive to *Trichinella* but not to the other antigens Tests done on 25 subjects who had been exposed to infestation with *W. bancrofti* and who showed clinical symptoms of this although microfilariae could not be found showed that all were positive to 1 8 000 dilutions of *Dirofilaria*

antigen But 6 were positive to dog protein in the same dilution and two were positive to *Trichinella* antigen while one reacted to all the antigens and to the saline control as well

For passive transfer studies blood was taken from three cases of filariasis who gave positive reactions to a 1 8 000 dilution of *D. ofilaria* antigen but no reactions to the control substances Six recipients of this serum five of whom had never been outside the continental limits of the United States each received four injections of 0.1 cc. of the serum intradermally and 24 hours later these sites were respectively injected with 0.01 cc of *Dirofilaria* antigen dog protein *Trichinella* antigen (all at 1 8 000) and with physiological saline Controls were done with these materials on the left arm which had not had any serum In the prepared sites the *Dirofilaria* antigen gave positive results in four out of the six subjects On the control left arm there was no reaction to *Dirofilaria* or *Trichinella* antigen or to the saline but one subject who had handled laboratory dogs for over a year was positive to dog protein

Complement fixation tests with antigen in dilutions of from 1 100 to 1 1600 and serum diluted up to 1 16 or undiluted were negative although positive results were obtained with rabbits immunized with the residue from the antigen preparation An alcoholic *Dirofilaria* antigen appeared to be inferior to the saline one Seven out of twelve rabbits thus immunized died and this seems to indicate that the adult worms contain some toxic substance This substance may be connected with the fact that the intradermal tests were followed by an exacerbation of symptoms of lymphangitis in seven subjects and by pain in the scrotum and lymph glands especially the inguinal glands in each subject The authors conclude that the *D. ofilaria* antigen at a dilution of 1 8 000 if it is used with the control materials mentioned is useful for the diagnosis of filariasis but they do not agree that the dilutions of 1 200 used by TALIAFERRO and HOFFMAN [this Bulletin 1931 v 28 214] or 1 200 and 1 1 000 used by FAIRLEY [ibid 1931 v 28 679 1932 v 29 427] are reliable for diagnosis The authors emphasize the necessity of a dilution of *D. ofilaria* antigen which will not give positive reactions due to infestations with nematodes other than *H. bancrofti*

G Lapa e

LAMY L Int ns té et itesse lat es d la formation des dispos tifs capteurs ch les Hyphomycètes prédateurs d Nématodes [Intensity and Speed of Development of Hyphomycetes Predatory on Nematodes] C R So B ol 1943 J v 137 No 11-12 337-9

See this B ll t 1939 36 833

ESCHIEVS R & LAMY L Conditions prat que de culture de sporulation et de recolte des spores d Hyph mycètes p édateurs d Nématodes [The Cultivation of Hyphomycetes Predatory on Nematodes] C R So B ol 1943 Jun 137 No 11-12 381-3

DEFICIENCY DISEASES

JAFFE R in collaboration with K NEUBURGER Beriberi como causa de muerte en Venezuela [Beriberi as a Cause of Death in Venezuela] *Rev Policlínica Caracas* 1944 Jan-Feb v 13 No 74 7-14

[Not a very satisfactory paper in that the evidence adduced is—the authors themselves acknowledge it—insufficient for a decision to be reached] The authors state that in some 10 per cent of cases showing evidence of myocarditis at autopsy there is no proof of the presence of syphilis schistosomiasis or ankylostomiasis and that these may be due to beriberi. In other words the myocarditis is insufficient to warrant a diagnosis of beriberi. If at the same time there are signs of neuritis the diagnosis is more likely but still not absolutely certain. They give notes of examination of the heart and of the nerves of the legs of 13 suspicious cases but in four the nerves showed microscopically no change. In the others there were indications of syphilis or of schistosomiasis or hookworm infestation and in one patient pyloric carcinoma so that no case of uncomplicated beriberi came to histological examination. Consequently the authors conclude that it is highly probable that in Venezuela there are cases of beriberi with anatomical lesions so grave as to cause death for some show cardiac dilatation without myocarditis but with changes corresponding to those described in medical literature in cases of avitaminosis that cases of myocardial infiltration occur for which no obvious cause can be assigned [hardly a satisfactory reason] that myocardial lesions may be associated with signs of degeneration in the peripheral nerves of the legs

H Harold Scott

DRIZ O Observações e ligeiras notas acerca de cinco casos de pelagra [Notes on Five Cases of Pellagra] *Brasil Medico* 1944 Feb 19 & 26 v 58 Nos 8 & 9 51-8 8 figs

It was generally held in the principal medical centres of Brazil that the incidence of pellagra was very low. The same was true of the rural areas as the result of an enquiry in 1933. Since then the disease has been found to be not so rare in certain provinces as was formerly supposed possibly owing to faulty diagnosis in the past and deterioration of nutrition more recently. The author gives notes upon five ordinary cases of pellagra which will serve to interest practitioners in Brazil

H S Stannus

GILLMAN T GILLMAN J INCLIS J FRIEDLANDER L & HAMMAR E Substitution of Whole Stomach Extract for Vitamins in the Treatment of Malignant Infantile Pellagra [Correspondence] *Nature* 1944 Aug 12 210

In three years almost 300 children suffering from acute malnutrition have been admitted to the non European hospital in Johannesburg more than 60 per cent showed clinical signs of pellagra. The syndrome included oedema pellagrous skin lesions bulky pale stools containing much unsplit fat extremely low serum albumin and globulin mild microcytic anaemia diffusely fatty liver. The authors have devised an improved liver biopsy technique and have found that the microscopic appearance of the liver is the best guide in assessing the severity of the condition

This condition has been described in Uganda by TROWELL [this *Bulletin* 1941 v 38 22] in the Gold Coast by WILLIAMS [*ibid* 1934 v 31 344] in South Africa by MACNICAR and by KARK [*ibid* 1944 v 41 418] and the present authors have found as Trowell did that vitamin therapy failed to avert death in a large proportion of cases. They record the results of treatment in 20 children 7 of whom were treated with thiamin nicotinic acid or brewers yeast (with 6 deaths) 7 with crude liver extract injected twice daily for 7 days (with 2 death) and 6 with 10 gm ventriculin (Parke Davis) plus 10 cc. of N/10 hydrochloric acid daily in one dose for 5 days (no deaths). The response to crude liver was slow but that to ventriculin was dramatic although these children were as severely affected as the others the liver was almost free of fat within two weeks.

In 7 cases of severe pellagra in adults ventriculin was found to be a much more rapid and effective treatment than nicotinic acid or other vitamins though the mental symptoms responded slowly.

Much has recently been written on malnutrition in Africa and there seems to be no doubt about the seriousness of the problem!

Charles Wilcocks

GILLMAN T & GILLMAN J Mitochondrial Origin of Cytosiderin (Iron Pigment) in the Liver of Human Pellagrins (Correspondence) *Nature* 1944 July 29 145

The terms haemosiderosis and haemochromatosis have in the past focussed attention on the metabolism of haemoglobin as the cause of the accumulation of iron in the body tissues.

Using an improved liver biopsy method the authors have studied the liver at the time of admission and during therapy of 76 non-European pellagrins—21 children under seven years of age and 55 adolescent and adult. The presence of masses of iron-containing pigment in liver cells at one stage or another they regard as a constant feature in pellagra among adults but it is not found in children under nine. The iron pigment they believe arises within the cells of the liver first in the region between the nucleus and the biliary pole of the cell corresponding to the portion occupied by the Golgi apparatus. They therefore speak of cytosiderin.

By means of certain techniques the authors demonstrated simultaneously iron-containing pigment and Sharlach staining fat in one section and iron fat and mitochondria in another. From this it is argued that the granules of cytosiderin developed from mitochondria which passed through a holo-protein state to form combined and free iron. Cytosiderin is carried to the portal tracts and when there is extensive hepatic cytosiderosis the lymph glands in the porta hepatis assume a deep brown colour. With the progress of this disease the portal tracts become thickened leading ultimately to typical pigment cirrhosis. The fatty liver of pellagra may go on to pigment cirrhosis.

H S Stannus

BEAN W B SPIES T D & VILTER R W A Note on Irradiation Sickness. *Amer J Med Sci* 1944 July v 208 No 1 46-54
6 figs (2 coloured)

In 1938 it had been demonstrated by the authors that nicotinic acid was of use in combating the symptoms of irradiation (X rays)

sickness—nausea vomiting headaches cramps and diarrhoea. The behaviour of urinary pigments and the codehydrogenases I and II after irradiation of the spleen resembled that in severely ill pellagrins.

In their more recent investigation the effects of a standard dose of irradiation was studied in (a) normal well fed subjects (b) those given a diet deficient in vitamin B with or without supplements of vitamin (c) pellagrins.

Persons on a diet poor in the vitamin B complex developed roentgen sickness which could be prevented or reduced in severity by giving supplements of nicotinic acid or thiamine for a few days before irradiation.

Once the reaction was established exhibition of these substances was relatively ineffective.

The authors are of opinion that no very definite conclusions are justified from these results.

H S Stannus

DERMATOLOGY AND FUNGOUS DISEASES

SYMMERS D & SPORER A Maduromycosis of the Hand with special reference to heretofore Undescribed Foreign Body Granulomas formed around Disintegrated Chlamydospores *Arch Pathology* 1944 May v 37 No 5 309-18 6 figs

A white man aged 67 fell and injured his right hand with splinters from the floor boards of a house in New York. Two or three weeks afterwards the hand became greatly swollen and later developed numerous sinuses connected with hard deep seated nodules from which pus containing black gunpowder like grains was discharged. The lesion was a typical mycetoma of one of the black grain varieties. A short course of intensive treatment with potassium iodide caused an acute inflammatory reaction in the lesions and was not continued. The duration of the disease at the time of publication was about seven years and X ray examinations made at intervals over a period of six years showed progressive bone lesions consisting of rarefaction of some of the carpal bones and the heads of the metacarpals with productive periostitis of the shafts of some of the metacarpals and the proximal phalanges. The causative fungus was not identified [the brief account given suggests that it may have been a species of *Madurella*] nor did the authors succeed in cultivating it. A description of the histology of the lesion adds little to our previous knowledge. J T Duncan

ALONSO J M & CANCELA FREIJO J Histoplasmosis de Darling. Primera observación efectuada en el Uruguay. Curación clínica luego de tratamiento con sulfadiazina. (Nota preliminar) [The First Case of Histoplasmosis in Uruguay. Clinical Cure after Treatment with Sulphadiazine] *Arch Uruguayos de Med Ciru y Especialidades* 1944 Mar v 24 No 3 193-210 5 figs English summary

TROPICAL OPHTHALMOLOGY

A REVIEW OF RECENT ARTICLES XLIV

Trachoma—The difficulties associated with experimental research in trachoma are exemplified by the observation of BLAND¹ that grivet and vervet monkeys frequently suffer from a spontaneous folliculosis indistinguishable from the conjunctival reaction induced in them by the inoculation of trachomatous material. These monkeys are however susceptible to trachoma and though the virus retains its capacity to infect man after four passages through the monkey inclusion bodies are not to be found in the animal's conjunctiva. The inclusion bodies reappear in the human subject infected from a grivet of the fourth passage concurrently with the development of clinical trachoma.

BURNET² and others have reported experiments in which they have infected mice with trachoma virus by peritoneal and intranasal inoculation and have produced a condition closely resembling trachoma by inoculating the conjunctiva of human subjects with an emulsion of infected mouse lung tissue. No macroscopic or microscopic changes could be observed in the infected mice but emulsions of their lungs and spleens caused a reaction in the chorio-allantoic membrane of the chick similar to that caused by the inoculation of the rickettsiae of epidemic typhus. This reaction continues to be produced after repeated alternating passages through mouse and chick.

The fact that the trachoma block of the LCC Hospital at White Oak has been closed owing to lack of patients is evidence of the value of good hygiene and efficient school medical service in preventing the disease. SORBY³ in recording this event pleads that the disease should be made notifiable and that statutory provision be made for treatment centres. In a review of the efficacy of the treatment of trachoma by the sulphonamides ROHRSCHEIDER⁴ remarks that mass treatment by the oral administration of an efficient drug would be a great advantage as it would effect a considerable saving in the services of trained medical men. Differing opinions have been expressed regarding the efficiency of the sulphonamides in the treatment of the disease. Uncertainty of diagnosis, variation of the disease in different geographical localities and the occasional occurrence of spontaneous cure render it difficult to estimate the value of treatment by the drugs but the majority of observers report in favour of sulphanilamide therapy. Some consider that although complete cure does not result the conjunctiva is freed from secondary infections and the trachoma rendered quiescent so that recovery is facilitated. Others claim that trachoma can be cured completely by treatment with the drug alone.

For the 43rd of this Series see Vol. 41 pp. 09-51

- BLAND J O W Spontaneous Folliculosis of the Conjunctiva in Grivet and Vervet Monkeys (*Larotrys grisea* and *Trichopeltis capensis*) and the Susceptibility of the Grivet to Trachoma Virus. *J. Path. & Bact.* 1944 Apr 56 \ 161 71 4 figs (coloured) p. 16 (16 refs.)
- BURNET E CASHMAN V CREED A & ALFRED I Oculat. n. experim. tales d. trach. mateaux. *J. Hyg. Camb.* 1944 Apr 56 \ 161 71 4 figs (coloured) p. 16 (16 refs.)
- SORBY A Trachoma in London. *Ed. fa Chapter B u M d J* 1944
- ROHRSCHEIDER W D H namidbehandl. g be der Bekämpf. g des Trach. ms. *Deutsch. Woch.* 1943 \ 1 69 \ 4 46 69 \ 10

Very prolonged observation however is necessary before one can be sure that relapse will not occur. At a special trachoma hospital at Soldau 151 cases of the disease were treated 126 by sulphanilamide alone and 25 with additional local treatment. Apparent cure was obtained in 83 improvement in 32 and 11 were unaffected. The author's own experience leads him to conclude that the sulphonamides have a specific action in the disease and that the improvement observed is not merely due to the elimination of secondary infections. He has found no essential difference in the efficacy of the various preparations and has had as good results from protracted treatment with small doses continued over a long period as from intensive treatment with large intermittent doses. For a man weighing 70 kgm he has used albucid [sulphacetamide] in a daily dose of 1.5 gm for two weeks followed by an intermission of two weeks—total 126 gm and in a daily dose of 4.5 gm for one week followed by seven days intermission—total 126 gm. He has found sulphanilamide therapy particularly effective when combined with the ordinary local treatment of the disease.

Cornea—AYOUB⁵ has described a form of keratitis among the troops of the 8th Army when fighting in the desert during the summer of 1942. Patients complained of photophobia and profuse lachrymation with smarting and itching of one or both eyes. There was moderate conjunctival injection and a band of roughened corneal epithelium could be seen in the area exposed by the palpebral aperture when the eyes were screwed up. This band was greyish but translucent and stained with fluorescein. The lesion was punctate and might be limited to a few lines of greyish dots. Full mydriasis was found to relieve the discomfort. Recovery occurred in five or seven days. The author considers that the condition is probably due to a dryness of the corneal epithelium induced by a hot dry wind and suggests that the use of goggles would prevent its occurrence. He remarks too that desiccation may be a more potent factor than excessive ultra violet light reflections in the causation of snow blindness.

GALTON⁶ has reported good results in the treatment of *perforating corneal ulcer* by the local and oral employment of sulphanilamide together with the excision of any prolapsed iris and the use of a conjunctival flap. He has treated fifteen cases twelve of these had had trachoma and eight suffered from entropion and trichiasis. The lachrymal sac was apparently healthy in every case. Malnutrition was a predisposing factor in the causation of the disease. The eyes were cleaned for three or four days by irrigations with 1-10 000 perchloride of mercury lotion and by insufflations of sulphanilamide powder. After the conjunctival flap had been fashioned the prolapsed iris was freed with a spatula from the edges of the ulcer and then drawn out and excised. Retraction of the membrane ought to occur. The conjunctival sutures usually cut out after five or six days.

H Kirkpatrick

PESSÔA S B Profilaxia do tracoma no Estado de S Paulo
[Prophylaxis of Trachoma in S Paulo] *Brasil Medico* 1944
Apr 22 & 29 \ 58 Nos 17/18 140-47 1 map & 1 fig

[The title of this article hardly covers the contents. The author describes the epidemiology of the condition its prevalence in different

⁵ AYOUB J E M Desiccation Keratitis *Brit J Ophthalm* 1944 July \ 8
No 7 347-53 5 figs

⁶ GALTON E M G Treatment of Perforating Corneal Ulcer *Lancet* 1944 Aug
26 272-3

districts by race and age the cause the stages of the disease and the measures taken to deal with it from the early years of the present century.]

First as regards prevalence optimists estimate the number of cases as 250 000 among a population of seven million pessimists give more than four times this more than a million. The authors strike a happy mean and call it 500 000. The percentage in rural districts is about ten times that of urban but when the urban figure is high the rural is correspondingly high. The negro seems to be more resistant to infection than does the white man predisposing factors are insanitation and overcrowding and naturally where hygienic conditions are bad children largely suffer. Contagion may be carried by lice or other ectoparasites by insects such as house flies *Hippelates* and others and by direct contact or transmission by soiled towels and the like.

Sulphanilamide is used in treatment with great success. The history of campaigns against the disease is a chequered one. In 1904 a decree was passed ordering the removal and repatriation of all immigrants suffering from trachoma and in 1906 a Service of Prophylaxis was instituted with Dr Euclio de Queiroz at the head assisted by 56 doctors and 362 laymen. Two years later this was abolished for financial reasons. In 1911 the Service was re-established with 16 doctors 32 nurses and two secretaries. In another three years in 1914 it was again abolished. In 1918 the Governor created four Commissions consisting altogether of eight doctors eight nurses and 11 assistant. Six years later this Service was merged with General Health Service and the special work was stopped. Then in 1928 the Trachoma Service was re-established but its work was confined to the capital. Finally in 1941 dispensaries were established and rural posts the latter comprised fixed posts and travelling ambulances. In the article a map is given showing where these posts have been set up but it is so small a scale that even with a lens the names are not decipherable. In 11 months of 1943 72 dispensaries and 15 fixed rural posts were established and during that time 47,270 persons were treated totalling 544,674 attendance and 984 institutions schools creches etc were visited. Of those treated 41,427 were from the interior of the State and 5843 in the Capital.

H Harold Scot

MISCELLANEOUS

LEIGHMAN A W D & KELSALL A R. A Year of Military Medicine in India. *Lancet* 1944 Aug 19 231-5

At a large base hospital in Western India 11 645 cases were treated in one year from August 1942. Of these 51.5 per cent were of tropical diseases. Most of the patients were British soldiers a few were Indian or Anglo-Indian.

Although the hospital was in an area of low endemicity there were 2819 cases of malaria. 2010 of the cases were benign tertian infections 46 per cent of which were relapses. 595 were malignant tertian including 30 per cent of relapsed cases. 12 were quartan and 51 were mixed infection. The rest were diagnosed on clinical grounds most of them had been under treatment before admission.

The too-prevalent practice of starting treatment before finding the parasites is regarded as being seldom justified [The word seldom deserves emphasis because there are sometimes conditions in which this unscientific practice is quite justified]

Typically periodic temperatures were exceptional at the onset so that at this stage the disease was often clinically indistinguishable from the prevalent undifferentiated short fevers

Relapses were frequent after the standard Army treatment which consisted of 30 grains of quinine daily for two days 0.3 gramme of mepacrine daily for five days two days rest and then 0.03 gramme of pamaquin daily for five days Intravenous treatment was needed in a small number of the malignant tertian cases

There was one case of acute haemoglobinuria which occurred on the fourth day of the course of pamaquin the haemoglobin was reduced to 14 per cent but there was rapid recovery without transfusion In another case there was an attack of acute haemolytic anaemia with a fall of the haemoglobin to 10 per cent this occurred early in the treatment and rapid recovery followed There were two deaths from cerebral malaria in cases in which repeated intravenous injections of quinine failed

Persistent anaemia with splenomegaly was rare even in cases with repeated relapses

There were 261 proved cases of bacillary dysentery of the following types the figures in brackets are percentages Flexner (52.4) Shiga (15.7) Sonne (13.8) Schmitz (8.8) Boyd (8.8) and Newcastle (0.5) In 511 other cases diagnosed as bacillary dysentery the organisms were not isolated and there were also 509 cases of diarrhoea

Saline treatment was found to be of definite value of a small group of 32 cases half were treated with salines and the stools became free from blood within two days the other half who were not given salines continued to pass blood for three to four days and in some of them there was persistent abdominal discomfort

Supplies of sulphaguanidine were limited but in most cases recovery was so rapid that little advantage could have been expected from its use In one case in which succinyl sulphathiazole (94 grammes in five days) failed there was a prompt response to sulphaguanidine otherwise little difference was observed in the effects of the two drugs

There were only three deaths two in patients with cirrhosis of the liver and one in a patient with chronic refractory anaemia

Among the 501 cases of amoebic dysentery the diagnosis was confirmed by finding parasites in all but 29 There were 35 cases of amoebic hepatitis and five of amoebic liver abscess The frequency of amoebic infection was striking about one fourth of all the admissions for diarrhoea turned out to be due to this cause No less than 45 per cent of the 333 fresh admissions for amoebic dysentery were relapses Primary attacks yielded promptly to emetine 6 to 12 grains in all This was followed by a course of carbarsone Amoebiarson or acetarson by mouth for 10 days In relapses the treatment was less effective and in cases with several relapses it ultimately failed altogether Emetine bismuth iodide was not available till near the end of the period but in 13 cases with persistent relapses a course of this combined with quinoxyl gave very disappointing results six of the patients had already relapsed within 21 days [presumably up to the time of writing] An urgent need is expressed for a drug that will cure chronic and relapsing cases

Amoebic hepatitis always responded quickly to emetine so did four of the cases of liver abscess in which cure followed a course of the drug and aspiration. In the fatal case there was no response closed surgical drainage was carried out and post mortem there was extensive amoebic ulceration of the bowel and the right lobe of the liver was reduced to a mere shell.

In several cases of amoebic dysentery there were granulomata simulating appendix abscess carcinoma and other conditions.

In one of the two fatal cases there was perforation of the bowel and intussusception.

A persistent non specific colitis gradually developed in some of the case both of amoebic and bacillary dysentery.

There were 1134 cases of short fever which ran a mild course of two to seven day leucopenia was common but the true picture of dengue and sandfly fever was not presented. [The term true picture applies only to epidemics of these diseases in susceptible communities in sporadic attacks in areas of endemicity typical pictures may be the exception rather than the rule.]

A chronic fatty diarrhoea occurred in 52 cases in four of these it followed amoebic and in seven bacillary dysentery. The authors hesitated to call these cases true sprue because 25 of the patients had already returned to duty though in a lower category apparently cured and only 18 had been evacuated. [As the usual duration of the treatment was about six months there need have been little hesitation in calling the disease sprue.]

There were 49 cases of effects of heat 46 of these were heat exhaustion the other three patients were admitted for aphasia and signs of cerebral degeneration resulting from heat hyperpyrexia in which the temperature had risen to 109-111 F and unconsciousness had persisted for 4-21 days.

There is a brief reference to 42 cases of tropical typhus with an average duration of 14 days 3 of the patients were admitted from the local region and 21 of these had a Weil Felix titre of 1-250 or over. In 13 the titre was highest to *Proteus O119* in three to OX2 in three to OXA in one to O119 and O12 and in one to OX19 and OXA. The reaction never became positive before the 10th day. The Widal reaction was positive in eight cases. There were no deaths. There was no louse infestation or obvious insect bites and one is left with the possibility that a flea is concerned.

Within eight months seven cases of tropical eosinophilia were seen. Bronchitis with an increase of the eosinophiles to 41-72 per cent was the chief feature. Neocarsphenamine was curative. All the patients were Indians or Anglo-Indians from coastal districts.

Infective hepatitis was diagnosed in 992 cases. The average duration of the illness was 29 days. There were no deaths. No cases of the disease without jaundice were recognized.

A very unusual occurrence was the admission of 68 British soldiers suffering from smallpox. There were 10 deaths eight in unvaccinated patients and two in patients who had been vaccinated in childhood only. Vaccination before the appearance of the rash carried out as a routine measure was thought to have aggravated the illness in five of the cases and one patient who was vaccinated 11 days before the appearance of the rash died of haemorrhagic smallpox. *Staphylococcus aureus* was isolated in pure culture from the pustules of all the patients.

who were examined bacteriologically Sulphathiazole was strikingly effective but sulphapyridine gave poor results

There were only two deaths among the 45 cases of enteric group fever of which 32 were typhoid and 11 paratyphoid A In many of the cases proved by culture the Widal reaction was negative and in one case of smallpox the titre with an O strain of typhoid was 1-640

Treatment was by insisting on an adequate intake of calories vitamins and fluids this was achieved by untiring efforts on the part of the nursing staff

There were 59 cases of limb paralysis caused by anterior poliomyelitis in two acute cases the iron lung was used but both patients died one of them suddenly a few days after being released from the apparatus

Among the 1 377 cases of respiratory disease which included 116 of pneumonia and 56 of pulmonary tuberculosis there were only two deaths both from the latter disease The authors insist that men with a tendency to lung trouble are quite unsuited for service in the tropics and that the same thing applies to skin diseases of which there were 1 242 cases

Among 215 direct admissions for dyspeptic symptoms 23 per cent were cases of peptic ulcer 71 per cent of these ulcer patients had had symptoms before the war with an average duration of 5½ years so that there was no evidence that Army life could be blamed for the development of the disease Other special causes of dyspeptic symptoms were amoebiasis without dysentery and worm infestation

[Altogether this is a record of which the authors have good reason to be proud the paper ought to be reprinted and circulated to every medical officer serving in India The standards of treatment and nursing must have been high seeing that there were only 30 deaths of which 10 were due to the very exceptional prevalence of smallpox There were not more than three deaths from any of the great tropical diseases malaria bacillary dysentery and amoebic infection]

John W D Meade

APLEY J & GRANT G H Eosinophilia with Pulmonary Disease on Return from the Tropics *Lancet* 1944 Sept 2 308-9

The authors give a very instructive description of the case of an Englishman aged 37 years invalided from India on account of a refractory condition known under the names Loeffler's syndrome eosinophilic lung and tropical eosinophilia in which none of the common causes of eosinophilia in the tropics is found unless it is a form of allergy a point not yet decided

The history of this patient is that he had suffered from mild recurrences of winter bronchitis since an attack of pneumonia in childhood After three months in Bengal [how long ago is not stated but probably nearly two years] he had a severe bronchitis with pain in the chest and troublesome cough X rays showed congestion and an opaque area in the left lung and fibrosis in the right Ten weeks later X rays showed nothing abnormal but the cough continued worse at night Some six weeks later an eczematous condition set in and as it proved refractory to treatment he was sent home to England Examination of stools urine and sputum yielded nothing positive to elucidate the cause During the ensuing two months after his return to England the leucocyte counts ranged from 7 000 to 16 000 per cm

and the eosinophiles between 6 and 40 per cent the last when the total was highest. The patient went on leave with his leucocytes 7 000 and eosinophiles 42.5 or 6 per cent [Nothing is said as regards his treatment or the subsequent course of his illness]

The authors draw up the following table contrasting Loeffler's syndrome and tropical eosinophilia which would seem to indicate two very distinct conditions but in the discussion which follows they show that none of these so-called distinctions has any true validity that they tend to run one into the other and that they are merely merging manifestations of one basal condition [see this *Bulletin* 1944 v 41 693 and 617 in the latter several other references are given]

<i>Loeffler's Syndrome</i>	<i>Tropical Eosinophilia</i>
1 Recorded in Europeans	1 In all races.
2 Dry European climate	2 Tropics near sea or in humid atmosphere
3 Mild disease lasting few days temperature raised 1 or 2 days	3 Acute febrile onset lasting a few weeks then becomes chronic
4 Variable transient eosinophilia (up to 66 per cent.)	4 Variable persistent eosinophilia (up to 89 per cent.)
5 No splenomegaly recorded.	5 Splenomegaly in acute phase
6 X-ray shadowing of the lungs variable in type but always resolving quickly	6 Disseminated mottling of both lungs in second week of illness after acute phase chronic bronchitis
7 Speedy spontaneous recovery	7 Chronic unless treated with arsenic

H Harold Scott

KARF Emily Menarche in South African Bantu Girls *South African J Med Sci* 1943 Feb v 8 No 1 35-40 1 fig [12 refs]

An enquiry was made as to the date of onset of menstruation in 1 038 Bantu school girls in South Africa. The girls came from four different rural areas two of which are in the Transvaal one in the Cape Province and one in Natal.

In all the groups investigated it was found that no girl had begun menstruating before 13 and that at 15 40.5 per cent at 16 80 per cent and at 19 100 per cent had commenced.

It was found that menstruation started about one year earlier in the two southern areas than in the two northern although the climate in the southern areas is colder. This finding though contrary to popular belief confirms the work of other investigators notably that of C. A. MILLS (*Hum Biol* 1937 v 9 43).

Diseases and malnutrition were less common in the southern areas. The exact influence of climate disease and malnutrition on the age of onset was difficult to assess. The author however considers that physique and health are important factors. *M G Blacklock*

VALENZUELA R. H. El tratamiento del noma [The Treatment of Noma] *Rev Mexicana Pediatría* 1943 Aug 10 v 13 No 8 310-16 [1-refs]

During the four years 1939-1942 36 cases of gangrenous stomatitis [noma or cancrum oris] were treated in the children's infectious

diseases section of the General Hospital at Mexico only six recovered. In 1943 the author treated six cases by the local application of sulphathiazole powder it was usually applied three times a day after preliminary cleansing of the area with Dakin's solution. No notes of the cases are given and it is not stated whether all the children recovered but the author considers that the treatment had a better effect than any other method that he has hitherto used. [See also this *Bulletin* 1942 v 39 411]

J F Corson

GEAR J H S YEO R M & BODENSTEIN J C The Aetiology of Onyala. *South African Med J* 1944 Aug 12 v 18 No 15 265-6

This paper is so full of facts that even a long abstract would fail to do it justice. To give a satisfactory account would need extracts rather than an abstract. Onyala is a bleeding disease characterized by acute onset of haemorrhage from nose mouth intestine and urinary tract purpuric spots in the skin and blood bullae in the buccal mucosa the blood showing lengthened bleeding time normal coagulation time normal prothrombin estimation but marked thrombocytopenia it is known in West and East Africa and in Rhodesia (possibly elsewhere).

The patient is usually a native but Europeans and others (Chinese for example) may suffer from the disease and the authors have found that in some cases at least the patient has recently been taking native medicine. During the illness this is acknowledged but on recovery strenuously denied even though the medicines may be found on the patient probably from fear of vengeance by the witch-doctor who has supplied them. One patient whose case is recorded had three native medicines one of which contained fragments of cantharides but the pathology of cantharides poisoning is not that of onyala and the dose of it was found not to exceed the B.P. medicinal dose. It may be as the authors suggest that even small doses may in certain individuals lead to sensitization manifested as a thrombocytopenia. On the other hand another of the native medicines was found by animal experiment to contain a haemorrhagic principle. Guinea-pigs injected subcutaneously in the thigh with 0.25-1.0 cc of a 1 in 10 emulsion in physiological saline died within 24 hours and extensive haemorrhages were found at autopsy from the injection site spreading even over the abdomen also the inguinal glands were enlarged and haemorrhagic the lungs showed haemorrhagic foci as did also the liver spleen the gastric and intestinal mucosa the adrenals and the kidneys. Further studies are to be undertaken to determine more accurately the nature of the haemorrhagic principle. The results of this work will be awaited with singular interest [see this *Bulletin* 1938 v 35 74 444 1939 v 36 157 158 938 1940 v 37 675 1944 v 41 427].

H Harold Scott

FORREST G H Propamidine A Report of its Use as an Antiseptic. *New Zealand Med J* 1944 June v 43 No 235 140-42

In the Solomon Islands the author treated eight cases of indolent tropical ulcer with 0.1 per cent propamidine in Mumford base (lanette wax hard paraffin technical white oil) or in a water soluble jelly base

with excellent results. In some bed rest and local application of sulphathiazole had been unsuccessful but propamidine effected apparently permanent cure in 10 days or less. The ulcer was completely filled with the preparation used, covered with a single layer of sterile gauze and the whole covered with a 3 inch strip of elastoplast. Dressings were changed every 24 (later 48) hours.

These applications are useful in the treatment of burns and of early otitis externa. Propamidine possesses many of the advantages of penicillin over the sulphonamides but requires none of the elaborate precautions to prevent deterioration, a point of some importance in the forward areas. No facilities for bacteriological investigation were available to the author.

Charles Wilcocks

ORSINI O. Pequena epidemia familiar de ulcera tropical [A Small Familial Epidemic of Tropical Ulcer] *Brasil Medico* 1944 Mar 4 & 11 v 58 Nos 10 & 11 72-4 2 figs. English summary (8 lines)

Six cases occurred in one family in Belo Horizonte. The oldest patient was aged 16, all the ulcers were on the lower leg or foot and the author contends that the affection was probably spread from one child to another as they lay together in bed where direct contact was probably frequent. The patient with most ulcers (4) was apparently the healthiest of these children and it seems therefore that poor general health is not a necessary precursor as has been supposed. Nevertheless poor condition probably does predispose to ulcer. The ulcers began as pustules, nothing is said of their originating in small abrasions of the skin.

Charles Wilcocks

THIERSCH J. B. Solar Radiation and Pernicious Anaemia in South Australia. *Med J Australia* 1944 June 21 v 1 No 26 583-4

SMITH (*Amer J Med Sci* 1934 v 188 200) concluded that a statistically significant relationship existed between the mortality from pernicious anaemia and the relative lack of solar radiation in the United States of America. ASKANAZY (*Fol Haematol* 1937 v 58 289) concluded that the incidence of pernicious anaemia in Europe gradually decreased from north to south. APPERLY (*Amer J Med Sci* 1944 v 203 854) also concluded that the mortality rate of pernicious anaemia and solar radiation were inversely related in U.S.A.

Adelaide, South Australia has a Mediterranean climate with a dry subtropical summer and the solar radiation there is very much greater than in England. Since the population is mainly of British stock a comparison can be made between the two countries of the effect of solar radiation on the incidence of pernicious anaemia and cancer of the skin. From a study of the figures bearing on the question the author could find no evidence to support the view of Smith and Apperly regarding pernicious anaemia but the incidence of cancer of the skin is far greater in South Australia than in the British Isles. As it occurs mainly on the face and hands this suggests that the increase is due to the greater solar radiation in South Australia.

J. F. Corson

FORNIELES ULIBARRI F Breve nota sobre un caso de miasis subcutánea producida por la larva de la *Hypoderma bovis* ? o la *Hypoderma lineatum* ? [A Case of Cutaneous Myiasis due to *H. bovis* or *H. lineatum*] *Rev Sanidad e Hig Publica Madrid* 1944 Jan-Feb v 18 No 1 75-6

TORRES CANAMARES F Nuevas localidades de *Phlebotomus* en España y algunas observaciones sobre los mismos [New Localities of *Phlebotomus* in Spain] *Rev Sanidad e Hig Publica Madrid* 1944 Jan-Feb v 18 No 1 38-9 1 map

MONCHADSKY A S BLAGOVESCHENSKY D I BREGETOVA N G & UKHOVA A N [The Search for New Repellent Anti Mosquito Substances] *Med Parasit & Parasitic Dis* Moscow 1943 v 12 No 5 56-62 [In Russian]

Very effective protection from mosquitoes can be secured by nets impregnated with repellent substances. A series of vegetable oils was examined for suitability for this purpose and dextra α pinene selected as deserving extensive tests. This substance is obtained from *Juniperus seravschanica* which is widely distributed in central Asia. Oil extracted from the young shoots contains cedrol which is used for medicinal purposes and in its purification d α pinene occurs in the waste products. Experiments were made with refined d α pinene and (since this is rather expensive) with the following mixtures —

1 Naphthalysol 20 parts pinene 10 parts water 70 parts

2 Lysol 15 parts pinene 8 parts water 77 parts

Before testing the repellents a survey of the mosquitoes in the district (Tadjik S S R) was made in August and September 1942. The numbers of the commonest species found were as follows —

	Open air		In cattle sheds		In dwellings	
	♀	♂	♀	♂	♀	♂
<i>Anopheles superpictus</i>	24	0	25	63	191	1
<i>Mansonia richiardii</i>	2944	0	57	0	52	0
<i>Aedes caspius</i>	57	0	72	2	16	0
<i>Culex spp</i>	61	0	47	3	8	0

Attacks of mosquitoes under natural conditions on men wearing nets impregnated with repellents were compared with controls wearing unimpregnated veils. Results —

Impregnant	No of tests	No of mosquito attacks in	
		Tests	Controls
d α pinene	14	3	156
Naphtha lysol pinene	38	8	512
Lysol pinene	7	1	112

Thus the repellent power of pinene and the mixtures was well demonstrated

Further experiments were made in a mud walled thatched native hut to test the effectiveness of the repellent in protecting dwellings. It was found that a coarse net (1.5 cm mesh) impregnated with pinene and hung across the window very greatly reduced the numbers of mosquitoes found indoors (mainly *A. superpictus*)

J R Burire

WAGENER H P Toxoplasmic Chorioretinitis *Amer J Med Sci* 1944 Aug v 208 No 2 255-64 [21 refs]

RAY H A Method of Rapid Staining of Intestinal Flagellates *Indian Med Ga* 1944 Apr v 79 No 4 158 12 figs on 1 pl

The following method though unsuitable for detailed cytological studies is said by the author to be a great aid to the proper understanding of the morphology of the organism

Place several drops of blood from the finger on a microscope slide and allow them to dry. Take up the material containing the flagellates with a long fine pipette and expel it on to one of the dried drops of blood and allow them to become mixed then take up the mixture which should be blood red in colour into the same pipette and streak it finely along a clean warm slide so that the streaks dry up immediately. Stain with Leishman or Giemsa stain. Ordinary thin films can also be made with the mixture but they produce a slight distortion of the flagellates. Photomicrographs of flagellates from the intestine of some animals illustrate the results

J F Corson

NOBLE G A A Five-Minute Method for staining Fecal Smears *Science* 1944 July 14 37-8

The following method of staining fresh smears of faeces is rapid and very suitable for showing intestinal protozoa though not so good as standard methods for critical cytological examination. The solutions used are: I Formalin (10 per cent by volume) 3 parts glacial acetic acid 1 part ferric ammonium sulphate 3 per cent. II Aqueous solution of haematoxylin 0.5 per cent. III and IV Dioxan V Dioxan and toluol (toluene) equal parts

Cover a thin wet smear of faeces with I and warm until it steams, pour off and add II and warm for a few seconds wash for one minute in running water in a jar remove excess of water and pass through III, IV and V allowing at least one minute's stay in IV. Mount in clarite

J F Corson

GLAZIER M & OLSON C Reno-Ureteral Colic in the South Pacific Area *US Nat Med Bull* 1944 July v 43 No 1 80-87

Renal or ureteric colic is a common complaint in the US Navy throughout the South Pacific area and to judge by the diagnoses made its cause is not well understood

The authors studied 30 cases admitted to a base hospital during five months of 1943. Haematuria was present in 23 tenderness in the costo-vertebral angle in 16 frequency of micturition dysuria and other

symptoms of lower urinary tract involvement in 18 and fever in six. In about one half of the patients pH determinations and examinations for crystals were carried out—the pH was always low (average 5.8) and the urine was always rich in crystals of uric acid urates and oxalates. In three cases calculi were found at radiological examination.

The condition is ascribed to excessive sweating and deficient fluid intake. These two factors lead to highly concentrated highly acid urine in which the crystals are precipitated and the haematuria and colic are probably the result of the passage of small calculi or of showers of crystals. [Sulphonamides were not involved in this series but the danger of their administration in the absence of adequate fluid is evident.] Treatment should consist of rendering the urine alkaline and the administration of large quantities of fluid. (This syndrome was reported in the Royal Navy much earlier in the war by BEACH (*Bulletin of War Medicine* 1944 v 4 326) whose conclusions are confirmed by the present author.]

Charles Wilcocks

BEAN W B & EICHNA L W Performance in relation to Environmental Temperature Reactions of Normal Young Men to Simulated Desert Environment *Federation Proc* Baltimore 1943 Sept v 2 No 3 144-58 16 charts

This is an important paper establishing for relatively large numbers of men some of the significant changes which occur during acclimatization to heat.

The subjects were 56 healthy men mostly between the ages of 20 and 28. They were exposed for one to three weeks in a room at a dry bulb temperature of 120 F from 8 a.m. to 5 p.m. and then at 90 F for all but two hours of the rest of the day the relative humidity in the heat being maintained at 20 per cent. The air movement was moderate and no additional heat by radiation was involved. In the morning two successive periods of work and in the afternoon three bouts of work were performed. The work consisted in one group of marching 2½ miles in 50 minutes carrying a 20 lb pack and in the second group of cycling.

The main results are as follows —

The unacclimatized man works in the heat with a high pulse rate a high body temperature and an unstable blood pressure particularly after change in posture.

With continued exposure and work in the heat acclimatization ensues and the heart rate rectal temperature and blood pressure return to levels approximating those obtained after similar work in cool environments.

The acclimatized man is alert performs his work energetically and without symptoms. The unacclimatized man working in the heat becomes dull and apathetic performs his work poorly has a rapid heart rate and a high rectal temperature and may manifest to varying degrees and either singly or in combinations the symptoms and signs of heat exhaustion.

The pulse rate and body temperature were used as indices of acclimatization and indicated that by the fourth or fifth day in most men a major part of the improvement had occurred. Men in good physical condition generally acclimatize more rapidly. Acclimatization to hot dry environments increases markedly the ability of men to work efficiently in hot moist environments.

J S Weiner

ADOLPH E F *Physiological Fitness for the Desert* *Federation Proc Baltimore* 1943 Sept v 2 No 3 158-64 2 figs [Numerous refs]

This paper a contribution to a symposium on fitness gives a brief review of the physiology of acclimatization to desert conditions. The well known fact that some individuals are better than others in withstanding these conditions is discussed. The individual difference is due largely to a greater ability to dissipate heat and depends on such factors as the number and size of active sweat glands. The important change in acclimatization are greater ability to carry out work, an increased rate of sweating and a circulatory improvement. The pulse rate is reduced, the peripheral blood flow is maintained with less intravenous pooling and the pulse pressure is reduced. The body temperature increases less during work.

Acclimatization to the desert is rapid. After the first two or three days when the man feels uncomfortable and lazy, a marked subjective improvement occurs. Acclimatization is retained even after several weeks without exposure.

To assess the fitness of a man in desert conditions, performance tests ought to be related to the work the man is actually expected to do. Fitness tests should in general include a walking test, a postural test and a manipulative test. The best criteria are probably measurements of changes in rectal temperature, pulse rate, pulse pressure and sweating. Other factors to be considered are age, resting pulse rate and the ratio of body surface to body mass. *J S Weiner*

BOOK REVIEWS

ROGER Leonard [KCSI CIE LLD MD BS FRCP FRCS FRS etc.] & MEGAW John W D [KCIE BAMB Hon DS Queen's University Belfast etc.] *Tropical Medicine* Fifth Edition pp. v+518 2 coloured pls & 87 text figs 1944 London J & A Churchill Ltd 104 Gloucester Place Portman Square [21s]

This fifth edition of what is now a classic of tropical medicine has been considerably re-written and brought thoroughly up to date. The biggest alterations are in the sections on malaria, kala-azar, trypanosomiasis, the fevers of the typhus group, leprosy and the dietetic diseases, and the whole is now a very comprehensive and accurate guide to the practice of clinical tropical medicine. Prevention and control of these diseases are not overlooked, but the book is strongest on the clinical and epidemiological sides. As before the writing and layout are clear and crisp. Much modern work is incorporated but set in its place easily and economically; the reader is not confused by over many small paragraphs recounting the investigations of individual workers from which to work out his own conclusions—

much of that is done for him. The re writing has not entailed lengthening the book though the amount of type on each page is greater than in the previous edition.

Inevitably perhaps the strongest chapters are those on diseases to which the two authors have made their own scientific contributions in the past but these are many. The study of malaria leishmaniasis the dengue group the typhus group amoebiasis cholera leprosy and other diseases has been much furthered by their work and the evidence of their continuing lively and critical interest is to be found in these pages.

The reviewer is glad to see that amoebic dysentery and amoebic hepatitis are now dealt with in contiguous chapters instead of being widely separated as in the previous edition. He would urge that the same linking be made between kala azar and dermal leishmaniasis which are still dealt with in chapters II and XVIII respectively. The inclusion of sections on diseases due to certain trematodes (other than *Schistosoma* which is dealt with) of the Far East would be appreciated by those who in future will work in those areas.

Those new to the tropics should read with care the chapter on climate as a disease factor. The present war has emphasized not only the powerful influence climatic conditions exert on health but also the avoidable wastage due to insufficient understanding of these effects. Much of this ill health could be prevented if the facts here so clearly expressed were taken to heart. Doctors going for the first time to the tropics would also be well advised to grasp the implications of the chapter on the incidence of general diseases in the tropics. To Europeans the tropical diseases loom large but in the indigenous peoples of hot countries although malaria and dysentery are massive causes of infant death and adult ill health the cosmopolitan diseases such as pneumonia tuberculosis and venereal diseases are more widespread than is commonly realized. These matters are put in good perspective.

Dietetic diseases are clearly discussed the medical and administrative authorities of tropical countries would do well to note the paragraph on page 407 —

Dietetic Malnutrition

This is so common in many parts of the tropics that it has come to be regarded as the normal condition of the inhabitants. In reality it is the most important of all the tropical diseases it causes life long disablement in hundreds of millions of people indirectly it is responsible for millions of deaths every year. The cause is an insufficient supply of proteins calories fats vitamins and other substances needed to maintain growth and health.

When the diet of these unfortunate people is adequate the treatment and control of tropical diseases will be easier. *Charles Wilcocks*

TRUBY Albert E [Brigadier General U S Army Retd] *Memoir of Walter Reed The Yellow Fever Episode* pp xviii+239 29 figs & 1 coloured pl 1944 London & New York Medical Book Department of Harper & Brothers [15s]

Many accounts or sketches of the life of Walter Reed have been written but none so full so detailed so carefully authenticated regarding what may be called the Cuban period as this by General

[AUSTRALIAN MILITARY FORCES] Friendly Fruits and Vegetables
 71 pp 37 figs (11 coloured) Notified in G O s dated 31st May
 1943 Prepared by the General Staff L H Q Australia and issued
 under the authority of the Commander Allied Land Forces
 S W P A By Authority Arbuckle Waddell Pty Ltd
 20 McKillop St Melbourne

In this pamphlet descriptions are given with plain and coloured photographs of the many vegetables fruits and nuts that are cultivated or grow wild in New Guinea and the adjacent islands. There are also notes on poisonous plants hints on cooking cleanliness and the care of cooking utensils and on precautions in regard to water for drinking. The pamphlet is intended chiefly for the soldier who may become isolated in the jungle and have to depend on himself to keep alive. Most of the plants described are native to Australia so the soldier should receive practical instruction in their identification in the rear training areas. The list is a long one and includes such valuable and well known foods as cassava maize sweet potato yam banana sugar cane pawpaw pineapple mango and coconut as well as many with less familiar names. The pidgin English name and the local name are given in most cases. The book measures about 4 by 5 inches and weighs less than two ounces.

J F Corson

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(The bracketed abbreviations after the page numbers indicate the subjects
Page numbers within brackets indicate papers not summarized)

Am signifies	Amoebiasis and Intestinal Protozoal Infections	Leish signifies	Leishmaniasis
Bart	Bartonellosis	Lep	Leprosy
Bl	Blackwater	Mal	Malaria
B R	Book Review	M s	Miscellaneous
Chl	Cholera	Oph	Tropical Ophthalmology
Der	Dermatology and Fungous Diseases	Pl	Plague
Diet	Deficiency Diseases including Epidemic Dropsy	Rab	Rabies
Dys	Dysentery (Bacillary and Unclassified)	R F	Relapsing Fever and others Spirochaetoses
Fev	Fevers including Dengue and Sandfly Fever	Sp	Sprue
Haem	Haematology	Tryp	Trypanosomiasis
Hel	Helminthiasis	Typh	Typhus
		Vms	Venom and Intoxications
		Y F	Yellow Fever
		Y & S	Yaws and Syphilis

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